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THE CANON MAGAZINE

Issue 184 • Nov 2021

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SUPER TEST

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PRO INTERVIEW

CHRISTIAN ANDERL

From surviving cancer to a thriving portrait career

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MINIATURE MARVELS

Simple solutions for better close-up photos outdoors

• Great video tutorials for you – see page 5 for details

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VISIT…

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EOS R3: NEW SPEED DEMON
We gets our hands on Canon's new R3 sporting hero pro mirrorless camera
Page 86

Canon

Peter Travers
Editor

Welcome

Do you remember when 10fps seemed like a super-fast continuous shooting speed? I was in awe when shooting at 10fps with a new EOS-1D Mark III back in 2008. I felt like I was armed with a machine gun as I rapidly photographed superbikes on a racetrack. But EOS camera fps speeds move quickly. The electronic shutters in the EOS R5 and R6 mirrorless introduced 20fps last year, but now the new EOS R3 sporting hero offers an eye-wateringly fast 30fps. It was great to gets my hands on the R3 and shoot with it, and you won't believe the incredibly clever AF, especially the new Eye Control AF. Read our comprehensive review on the EOS R3 on page 86.

Learn all you need to know to make the step up to a full-frame Canon EOS camera, from the benefits of bigger sensors and better bodies, to priceless used buying advice for cameras under £1000! See page 28. Our budding Apprentice gets up close with all sorts of creepy crawlies under the guidance of Canon pro photographer Oliver Wright, see page 8.

In our inspirational Canon Skills section, from page 43, we have new step-by-step photo projects; how to take great portraits even in harsh sunlight, control your ISO for better low-light Halloween shots, and how focal length affects your landscape images, plus new image-editing tutorials, all with free video guides.

We also speak to cancer survivor turned successful portrait photographer, Christian Anderl, on page 60. Plus, we test eight great macro lenses, from page 90.

Also don't miss your FREE *Seasonal Photography* eBook, details over the page.

Peter

Christmas subscription offer and gift!
Subscribe and save on print and digital editions + get a free Lowepro backpack worth £70! Page 38

OUR GUARANTEE

- We're the only photo magazine in the newsagent that's **100% DEDICATED TO CANON EOS CAMERA USERS**, so we're 100% relevant to your needs.
- **WE'RE 100% INDEPENDENT**, which means we're free to publish what we feel is best for **EVERY CANON DSLR OR MIRRORLESS PHOTOGRAPHER** – from beginners to enthusiasts to full-time professionals.
- We're **CANON ENTHUSIASTS** and, with our contributors, we can offer years of **EXPERT PHOTOGRAPHY EXPERIENCE**. We're always excited to pass on what we've learned.
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- Our Video Disc has **THE VERY BEST DSLR TECHNIQUE & PHOTOSHOP VIDEO GUIDES**, which can also be viewed via our digital editions.
- We're proud to use **THE WORLD'S TOP CANON PHOTOGRAPHERS** and experts. Meet them on page 6.

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PhotoPlus THE CANON MAGAZINE CONTENTS

BIG SENSOR BENEFITS

28 STEP UP TO FULL-FRAME

Your big guide to Canon EOS full-frame cameras, including great buying advice

ESSENTIALS

20 Inspirations
Take a close look at these photos using luscious shallow depth of field in our monthly Canon photo competition

28 Step Up To Full-Frame
Making the move to a full-frame EOS camera can be tricky, but with our guide you won't miss a thing – or waste any money!

38 UK Subscription Offer
Free Lowepro Truckee BP 150 backpack with our Christmas subs offer

60 Profile: Christian Anderl
Christian talks about his diverse career and the challenges he's overcome before becoming a successful portrait photographer

68 Photo Stories
Delightful sunsets and local wildlife – you're in for a treat from our readers

114 Focus Point
Your letters, stats and web news – stay up to date with the world of *PhotoPlus*

CANON PROS

08 The Apprentice
A Canon pro teaches our Apprentice to get up close to capture marvellous macro shots of miniature insects out in the field

40 David Clapp column
David dispels some common photo myths as he captures colourful scenery

72 My Kit
Find out what gear surreal horror photographer Alexander Sviridov uses

CANON SCHOOL

74 Part 6 Canon School
Find out how to use your Canon's built-in features to improve compositions

78 Software Solutions
Turn macro shots into magnificent macro masterpieces with Canon's DPP

80 EOS S.O.S
Brian answers your technical questions

NEW TESTS

84 Gear Update
Here's another heap of excellent Canon compatible gear for you to lust after

86 New test! Canon EOS R3
We get our hands on Canon's new super-fast, super-smart, sporty pro mirrorless EOS R3, but does it live up to the hype?

90 Super Test: Macro lenses
We test eight of the best macro lenses for capturing the miniature world in detail

102 Buyers' Guides
Stay up-to-date with all the latest Canon EOS camera bodies and Canon-fit lenses using our buyers' guides

PhotoPlus CanonSkills VIDEO GUIDES #184

6 WAYS TO IMPROVE YOUR PHOTOGRAPHY TODAY

44 **Project 1** Learn to tame the intense midday sunshine to take fantastic portraits and avoid harsh shadows and overexposure

48 **Project 2** Learn all about ISO and how to use it for low-light pictures at Halloween

52 **Project 3** Find out how your focal length affects your scenic compositions

54 **Tutorial 1** Unleash the power of Range Masks for faster and precise editing

56 **Tutorial 2** Create perfect B&W photos with Profiles in Adobe Camera Raw

58 **Tutorial 3** Craft a fun vintage contact sheet with Serif's Affinity Photo

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Meet the team...

PhotoPlus
THE CANON MAGAZINE

Who we are and our favourite articles inside this issue...

Peter Travers
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"Once I'd stepped up to a full-frame Canon EOS camera, I've never looked back. In our big camera guide, we reveal the benefits of a bigger sensor!" **PAGE 28**

James Paterson
Technique writer • 5D Mark IV
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"Taking portraits in harsh midday sunshine can feel impossible, unless you know how to work with the sunlight. In my big project this issue I show you how!" **PAGE 44**

Dan Mold
Technique editor • 1D X Mk III
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"For part five of my landscape photo series, I illustrate the difference in focal lengths when using wide-angle to telephoto lenses to capture scenic shots." **PAGE 52**

Louise Carey
Technique writer • R6
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"This issue in Lightroom, I show you how to mask parts of your images then selectively boost the brightness and temperature for better editing results." **PAGE 54**

This issue's contributors...

Oliver Wright
Canon professional and macro expert Oliver teaches our Apprentice how to take great insect shots. **PAGE 8**

Julie Tennant
For her shot of a woodland butterfly, Julie used a nice shallow depth of field to blur the background. **PAGE 25**

Christian Andrel
From surviving cancer to becoming a father and creating a thriving portrait photo business. **PAGE 60**

Alexander Sviridov
Canon portrait pro and digital artist Alexander shares his six favourite pieces of kit. **PAGE 72**

Peter Baker
Keen amateur Canon EOS photographer Peter reveals how it took some top shots of local wildlife. **PAGE 70**

James Artaius
Ex-*PhotoPlus* staffer turned Digitalcameraworld.com editor tests the amazing R3 speed demon! **PAGE 86**

Marcus Hawkins
Our favourite Canon nerd reveals the EOS camera features to improve your compositions. **PAGE 74**

Matthew Richards
Find out which is the best proper macro lens for your extreme close-up photos in our Super Test. **PAGE 90**

Our contributors Ben Andrews, Christian Andrel, James Artaius, Peter Baker, Drew Buckley, David Clapp, Stephanie Dowe, Marcus Hawkins, James Paterson, Matthew Richards, Alexander Sviridov, Keith Wilson, Brian Worley, Oliver Wright

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WHITE WALL

CANON PRO

NAME:
OLIVER WRIGHT

CAMERA:
CANON EOS R5

BASED IN Garforth, Leeds, Oliver has embraced Canon's latest mirrorless full-frame cameras, now shooting fantastic macro imagery of wildlife, plants and flowers with his EOS R5. A climbing accident back in 2010 was the catalyst for Oliver realizing his passion for photography, in particular wildlife. 11 years later and Oliver runs events with Canon and promotional videos. He's had multiple highly commended images in the British Wildlife Photography Awards and is the perfect pro to teach Matthew about macro. www.oliverwrightphotography.com

MINIATURE MARVELS

This month we paired up Canon macro pro Oliver Wright with *PhotoPlus* reader Matthew to learn to photograph an abundance of miniature critters up-close

APPRENTICE

NAME:
MATTHEW FARRUGIA

CAMERA:
CANON EOS R6

MATTHEW IS a student dispensing optician in his final year, from Peterborough, and loves to get out and about with his newly acquired Canon EOS R6 full-frame mirrorless camera. He's an amature wildlife photographer and would love to have the confidence to shoot macro subjects, such as bugs, flowers and fungi. He's written to us for help shooting close-ups and whether flash or natural light is best. We arranged for him to spend the day learning with Canon pro wildlife photographer, Oliver Wright, in his neck of the woods in Leeds.

THE APPRENTICE

HOT SHOT #1

PRO TIP

FOCUS PEAKING

FOCUS NEEDS to be extremely precise when shooting close with macro lenses, because your depth of field is extremely limited. Even high aperture values, such as f/22 and f/36, will deliver a shallow depth of field when the focus point is so close. This means focus stacking is important if you want to get a completely sharp small subject. To see exactly which area of the insect is in focus, Oliver uses the focus peaking mode on his EOS R5, which puts a vibrant red, yellow or blue outline around any areas of sharp focus on his LCD screen, or through the electronic viewfinder.

MATTHEW'S COMMENT

"I met up with Oliver at sunrise at one of his favourite local nature reserves in Garforth, called Ledston Luck. It was an ideal morning for photographing insects, as the sky was completely clear and Oliver only shoots with the available natural light. There was also virtually no wind, which really helps getting sharp shots that you can use for focus stacking, where you need every image to line up perfectly. Oliver showed me how to take a series of images with my macro lens using his focusing rail (see page 12), this meant I could get lots of different pictures with various parts of this blue-tailed damselfly in focus and then merge the sharpest bits of each together. This final image was seven pictures merged together in Photoshop CC to make it perfectly sharp throughout."

TECHNIQUE ASSESSMENT

Oliver dials in key macro settings on Matthew's mirrorless EOS R6

Lens	Canon EF 100mm f/2.8 Macro USM
Exposure	1/60 sec, f/5.6, ISO1600 (7 shots stacked)

TOP GEAR #1

Super macro lens

TO GET super close to his subjects Oliver uses the Canon MP-E 65mm f/2.8 1-5x Macro lens. Most 'true' macro lenses have a reproduction ratio of 1:1, which means the subject will be rendered at life-size, in other words the same size as if you laid it across the camera's sensor. The MP-E 65mm starts at 1:1, but can go to five times this magnification, making it possible to achieve frame-filling shots of incredibly small subjects. However, it does become more difficult to use at these incredibly high magnifications.

MANUAL MODE

OLIVER SET his and Matthew's EOS R5 and R6 cameras to Manual mode, so that they could dial in exposure settings without them being affected by the cameras built-in metering systems. This meant that if the light changed, their images would become brighter or darker, which meant that checking the rear LCD for a decent exposure was crucial. They also set up Raw shooting to give them a little leeway if the exposure was off when it comes to post.

KEY CAMERA SETTINGS

ALTHOUGH SHOOTING at sunrise, Oliver likes to go to areas that are still in shade, as once insects, like dragonflies and damselflies, are hit by the sun they start to warm up and become much more active, which makes sharp shots and focus stacks much more difficult. Shooting in the shade requires a tripod and a high ISO, which Oliver set to 1600 to begin. He also set the aperture to f/5.6, helping ensure that the depth of field wasn't too shallow. This resulted in a shutter speed of 1/60 sec, fast enough to freeze the stationary insects.

EXPERT INSIGHT

SHUTTER RELEASE CABLE

THE SIMPLE action of pressing the shutter button on your camera can cause vibrations, which are easily picked up as camera-shake at high magnifications. Using the 2 Sec Self-timer would leave too much time between shots when recording a focus stack, as it would give the insect a chance to move between shots. For this reason, Oliver uses a Canon TC-80N3 remote cable release, so he can fire off lots of shots remotely without physically touching his Canon camera body.

OLIVER'S TOP 10 TIPS FOR MACRO

1. **Get up early**
Insects like damselflies and dragonflies are very inactive at sunrise, which makes them easier to photograph.

2. **Visit local nature reserves**
Find a nature reserve close to you that you can regularly visit to practice and build up your macro skills.

3. **Give video a go**
Oliver usually sets up a second camera to record snippets of video to capture the insect's behaviour.

4. **Respect nature**
Move slowly and avoid creating loud noises that might scare your subject, don't disturb the habitat, and leave the site cleaner than when you arrived.

5. **Be patient**
Oliver will often search to find an insect in an ideal position to photograph them, usually in the shade is best, before they've warmed up and become active.

6. **Use natural light**
Oliver uses natural light. He found flash to be too harsh and created unnatural highlights on the insects. Use reflectors to bounce some of the natural light back onto your subjects if need be.

7. **Keep your kit clean**
Make sure you're getting the best image quality out of your kit by cleaning your lenses and camera sensor regularly, it'll cut down on editing time and the need to painstakingly remove dust spots too!

8. **Sharper macro shots**
Get your focus bang on. Try focus stacking and merging shots, and remember to use narrow apertures when shooting insects so close.

9. **Get the right kit**
Even budget macro lenses can produce brilliant results. If you already have one, invest in a focus rail, extension tubes and a good tripod.

10. **Use weather apps**
Check the weather the night before. Look out for clear mornings with low winds, as these conditions can net you the best results.

HOT SHOT #2

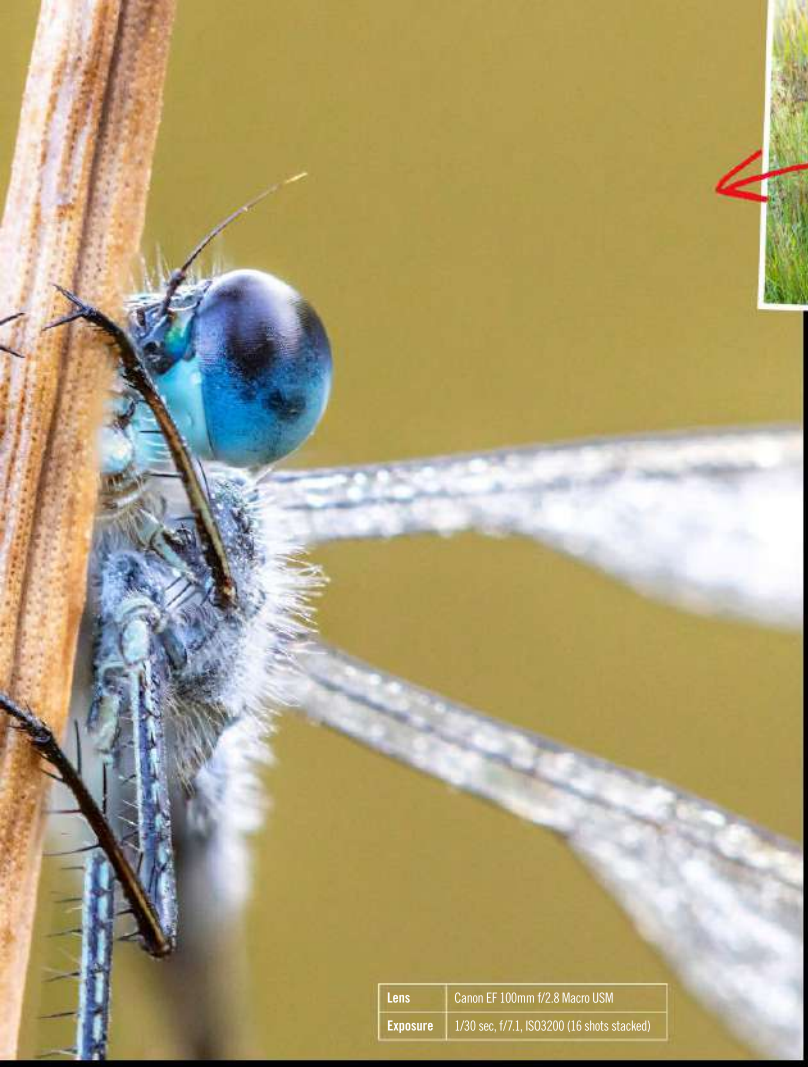
TOP GEAR #2
Focus rail

DEPTH OF field is incredibly shallow when shooting at high magnifications, even when using high apertures, such as f/22. To achieve macro subjects that are sharp throughout, Oliver uses a Novoflex Castel-L focusing rail, this is mounted on a Benro Mach3 carbon fibre tripod with an Induro PHQ 5-way head, giving him an astonishing amount of control when composing. The focusing rail allows him to precisely move the camera and lens forward or back a little to adjust the band of sharp focus.

PRO TIP

CHECK THE FOCUS

TO MAKE sure the focus is exactly where Oliver wants it, he uses Live View on his EOS R5 and makes the most of the digital zoom to see clearly where the focus is set. He does this when composing, and after taking his pictures using playback, to make sure the image is perfect. It's better to realize and reshoot while you're there, than discover your shots are out of focus when you get back home – you'll be stuffed at this point!



Lens	Canon EF 100mm f/2.8 Macro USM
Exposure	1/30 sec, f/7.1, ISO3200 (16 shots stacked)

TOP GEAR #3
Canon EOS R5 body

OLIVER'S CAMERA of choice is the Canon EOS R5 full-frame mirrorless camera. It has a whopping 45Mp sensor for incredibly detailed images and can shoot at a blisteringly fast 20fps, making it perfect for shooting wildlife and insects. It can also record video at 4K at up to 120fps and features in-camera focus bracketing, which is perfect for Oliver's macro work. The built-in sensor stabilization and low noise even at high ISOs has become essential for Oliver's work, which makes use of natural light, instead of flash, for a more natural look.

MATTHEW'S COMMENT

"Sunlight had started to hit our first damselfly, which meant that it was becoming more active and harder to take a series of still images for a focus stack. After a short walk we found another damselfly in a more shaded spot and it was perched on a dead branch. Oliver carefully cut the dead branch and placed it in a better position for us to shoot using his plamp (see right). Owing to the fact that damselflies are very torpid in the morning, we were able to gently move it without it flying away. It was then possible to position the branch exactly where we needed it to get a good photo. I wanted to see if I could get a shot where each of the damselflies eyes were peeking out from each side of the stick and used the focus rail once again, this time taking 16 shots. I merged them in Photoshop for a totally sharp photo."

EXPERT INSIGHT

USE A 'PLAMP'

OLIVER CARRIES two tripods with him in the morning. One is to shoot on, the other is to prop up a plamp – an articulating double-ended clamp that he can position to hold onto little twigs or branches. Oliver has a plamp from Wimberly, which he used to hold up a little bit of a dead stick that the above damselfly was perching on by a pond. Because the plant was already dead Oliver had no problem with carefully cutting it and placing it in a better position for photographs.

TOP GEAR #4

100mm macro

OLIVER'S OTHER main macro lens is the Canon EF 100mm f/2.8L Macro IS USM, which can shoot at up to 1:1, or even more with Oliver's handy extension tubes. Unlike his MP-E 65mm macro lens, which can shoot at 5x life-size, Oliver sometimes prefers to use this lens as it has a better working distance, fast USM autofocus system, image stabilization and a larger front element. Oliver has also been able to try out a Canon RF 100mm F2.8L Macro IS USM version and will be switching over to this native RF 100mm for his EOS R5 as soon as it starts shipping.

PRO TIP

EXTENSION TUBES

OLIVER USES a set of Kenko extension tubes to increase the distance between the lens and the camera body. This shortens the minimum focus distance, so you can get closer to your subject. The set comes with three adapters: 12mm, 20mm and 36mm. You can use a mixture of all three until your focus distance is spot-on.

EXPERT INSIGHT

FOCUS BRACKETING IN-CAMERA

OLIVER FOCUS stacks his pictures and merges them together to create macro images with incredible front-to-back sharpness. The Focus Bracketing mode on his EOS R5 can take up to 999 shots in a rapid burst, with all of the images at different focus increments, which makes the focus stacking process much easier and allows him to create a series of stacked shots without a tripod.

HOT SHOT #3

Lens	Canon MP-E 65mm f/2.8 1-5x Macro
Exposure	1/100 sec, f/7.1, ISO1600 (30 shots stacked)

OLIVER'S COMMENT

"For our afternoon session we headed to another of my favourite local spots, called Skipworth Common. There's some brilliant old crumbling walls along the paths that insects love to hide in. At this time of day I ditched the tripod in favour of shooting handheld using the better light and high ISO performance of my Canon EOS R5. To take a shot of this beautiful common darter dragonfly (sympetrum striolatum), I edged closely to the wall without spooking it and braced myself against it to steady myself as much as possible. The fantastic in-body stabilization on my EOS R5 then removes any small vibrations for a sharp shot. I used my R5's Focus Bracketing (see left) to take 30 images covering different focus distances."

TOP GEAR #5

EF-EOS R Mount Adapter

OLIVER ONLY recently switched over to the EOS R5 full-frame mirrorless and was using Canon DSLRs before. He still loves to shoot on some of his DSLR EF lenses, like the Canon MP-E 65mm f/2.8 1-5x Macro and Canon EF 100mm f/2.8L Macro IS USM, but is slowly switching his optics over to the new RF iterations when they are released. He uses the Canon EF-EOS R mount adapter to make his old EF lenses compatible with the RF mount.

EXPERT INSIGHT

CHANGE YOUR BACKGROUND

MOVING A little can change your background a lot. Generally, with macro shots, you'll want to turn your background into a vibrant wash of colour using the inherent shallow depth of field that macro lenses give you. See how a simple tweak to the composition in our example shots below have turned the dull brown background into a vibrant green one that makes the whole image look more natural and striking, just by moving our composition slightly.

HOT SHOT #4

Lens	Canon MP-E 65mm f/2.8 1-5x Macro
Exposure	1/250 sec, f/5, ISO3200 (48 shots stacked)

TOP GEAR #6

Wide-angle macro lens

ALONGSIDE HIS telephoto macro lenses, Oliver also keeps a Canon RF 35mm F1.8 Macro IS STM, which is a wide-angle optic with a 1:2 reproduction ratio for half life-size insect shots. This allows him to include more of the surrounding environment to add more context to his pictures than the his more telephoto 65mm and 100mm macros.

PRO TIP

BRING SPARE BATTERIES

TAKING BURSTS of 40 images at a time for focus stacking and recording 4K video will certainly take its toll on your batteries, this is especially the case on cold mornings, when the charge capacity of Li-ion batteries is diminished. Oliver carries plenty of spare batteries and memory cards, so he's always prepared and uses brightly coloured orange Extreme batteries from Hähnel, which have extra insulation to help them last longer in the cold.

TOP GEAR #7

Professional photo backpack

OLIVER USES the Tamrac Anvil 27 photo backpack to haul all of his kit around in. He lashes various bits of kit to his bag, including tripods, plamps and a small collapsible stool that makes crouching down for long periods much more comfortable. Inside, there's plenty of space to store his two mirrorless Canons, an assortment of macro lenses, as well as his Canon EF 100-400mm f/4.5-5.6L IS II USM lens, which is great for macro shots where you need a larger working distance.

OLIVER'S COMMENT

"There are more than 40 species of jumping spiders in the UK making them one of the most common spiders around, but they're incredibly small and fast, which can make them tricky to photograph. We found this fantastic evarcha falcata (left), which posed nicely for me and Matthew for a long period without flinching, allowing us to get some great shots. Because they're tiny insects, smaller than the nail on your little finger, my MP-E 65mm lens came in handy, as shooting at 3-5x life-size I was able to get a frame-filling shot. The 45Mp sensor on my EOS R5 also makes it easy to crop in a little in post. I took 48 images for the focus stack here to ensure all of the fine hairs on the spider legs were sharp. If you look closely you can see Matthew's reflection in the eyes!"

OLIVER'S MAGICAL MACRO SHOTS

Three of Oliver's all-time favourite marvellous macro images

BANDED DANDED DEMOISELLE

THE SUN was rising behind some foliage, which softened the sun and it allowed me to capture one of my favourite insects with the sun rising behind it at the same time.

DEWY DAMSELFLY

THIS WAS a stacked shot during the heaviest dew I have seen this year. I love how the compound nature of the eye is magnified in the drops and also how the grass background is refracted.

AMETHYST DECEIVER FUNGI

I LIKE this image as an example of why macro can be worked on all year. Here, I gently illuminated the mushroom with a small LED panel to make it pop against the forest floor.

SHOT OF THE DAY!

MATTHEW'S COMMENT

Oliver's insight and knowledge with the macro insect world is so comprehensive and I was happy to soak it all up like a sponge – I didn't think I could learn so much in a single day! While I'm an amateur wildlife photographer and can photograph mammals and birds no problem, I've always found it difficult to get good results with close-up images. I had invested in a ringflash kit to help me take macro images, but watching Oliver get amazing results with just natural light means that I'll be selling it all as soon as I get home! Thank you so much *PhotoPlus* for the incredible experience, after the session I now feel like a more well-rounded wildlife photographer and look forward to putting my new skills into practice straight away.

OLIVER'S VERDICT

This has to be my favourite image that Matthew took on the day and it was one he shot at Ledstone Luck at sunrise. He used his EOS R6 and EF 100mm f/2.8 Macro USM on my focusing rail and was able to take five shots and merge them together to broaden the focus area, so the insect is pin-sharp. I love the long side-on profile of the blue-tailed damselfly covered in dew drops. The colours are soft and gentle and the subject is packed with incredible detail. Matthew certainly has a great eye for a photograph and hopefully I've given him some pointers he'll be able to use throughout autumn and winter on new subjects that present themselves in these seasons, like fungi, mushrooms, spiders and dead leaves, as well as snowflakes and icicles in winter.

Lens	Canon EF 100mm f/2.8 Macro USM
Exposure	1/125 sec, f/5.6, ISO1600 (5 shots stacked)

INSPIRATIONS

STUNNING IMAGERY FROM THE WORLD OF CANON PHOTOGRAPHY

01 WINNER JUVENILE RED KITE BY EDWARD PAYNE

This is a wonderful animal portrait with the red kite looking directly down the barrel of the lens. It's also full of sublime autumnal colours and leaves that perfectly complement the bird's brown feathers. Edward's framing works terrifically well, placing the subject right in the middle of his composition making for an unforgettable shot.

Lens	Canon EF 70-200mm f/2.8L IS II USM
Exposure	1/1000 sec, f/2.8, ISO250

INSPIRATIONS

02

Photocrowd

All the images in this gallery were entrants to the *PhotoPlus* 'beautiful depth of field' competition hosted on Photocrowd – a website where a public vote on the best-liked images is pitted against expert opinion. To enter our current contest, and vote on your favourite photos, simply visit **www.photocrowd.com**

02 GANNET BY NICK CLAYTON

Nick's done a stellar job at isolating this beautiful gannet from its background with a long telephoto 500mm lens and wide aperture of f/5.6. His focus on the gannet's eye is spot-on, and the shallow depth of field has blurred the foreground and background into a fantastic wash of colour, ensuring that the gannet gets the viewer's full attention.

Lens	Sigma 500mm f/4.5 EX APO HSM
Exposure	1/320 sec, f/5.6, ISO400

03 LUPINE BY KSENIYA MAKSIMENKO

Apertures don't get much wider than f/1.2, used here by Kseniya on this lupine flower. We love how she's used the curving flower stalk to lead a trail through the image that guides the eye. The shallow depth of field makes for a wonderfully gentle and soft aesthetic and has blurred the background into a brilliant wash of colour.

Lens	Canon EF 50mm f/1.2L USM
Exposure	1/180 sec, f/1.2, ISO100

04 COLOURS OF AUTUMN BY HENRIK SPRANZ

Henrik's taken a beautiful macro shot of this butterfly, which is pin-sharp and packed with incredible swirls of colour. The red and green leaves compliment each other and are the perfect background for his butterfly portrait, which has a lush abstract edge.

Lens	Canon EF 180mm f/3.5L Macro USM
Exposure	1/80 sec, f/4.5, ISO320

03

04

05 SCIENCE FICTION BY STUART WILLIAMS

This image is wonderfully minimal with the blue damselfly popping right out of its gorgeous, contrasting orange and red background. The focal point is perfectly sharp and the background is nicely blurred, due to a wide aperture of f/5.6, plus macro images inherently have a shallower depth of field as you're focusing closer to subjects.

Lens	Canon EF 100-400mm f/4.5-5.6L IS II USM
Exposure	1/2500 sec, f/5.6, ISO640

05

Photocrowd

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06 WOODLAND BUTTERFLY BY JULIE TENNANT

Julie's shot of this butterfly is tack-sharp and uses a shallow depth of field to blur the background. Her background is also much darker than her bright yellow focal point, so helps the butterfly pop out of the scene and acts as a vignette. Props to Julie for taking the time to plant flowers in her garden that attract the sort of insects she wants to photograph.

Lens	Canon EF 70-200mm f/2.8L IS III USM
Exposure	1/2000 sec, f/3.2, ISO160

07 MALAGASY BEAUTY BY MARCO TAGLIARINO

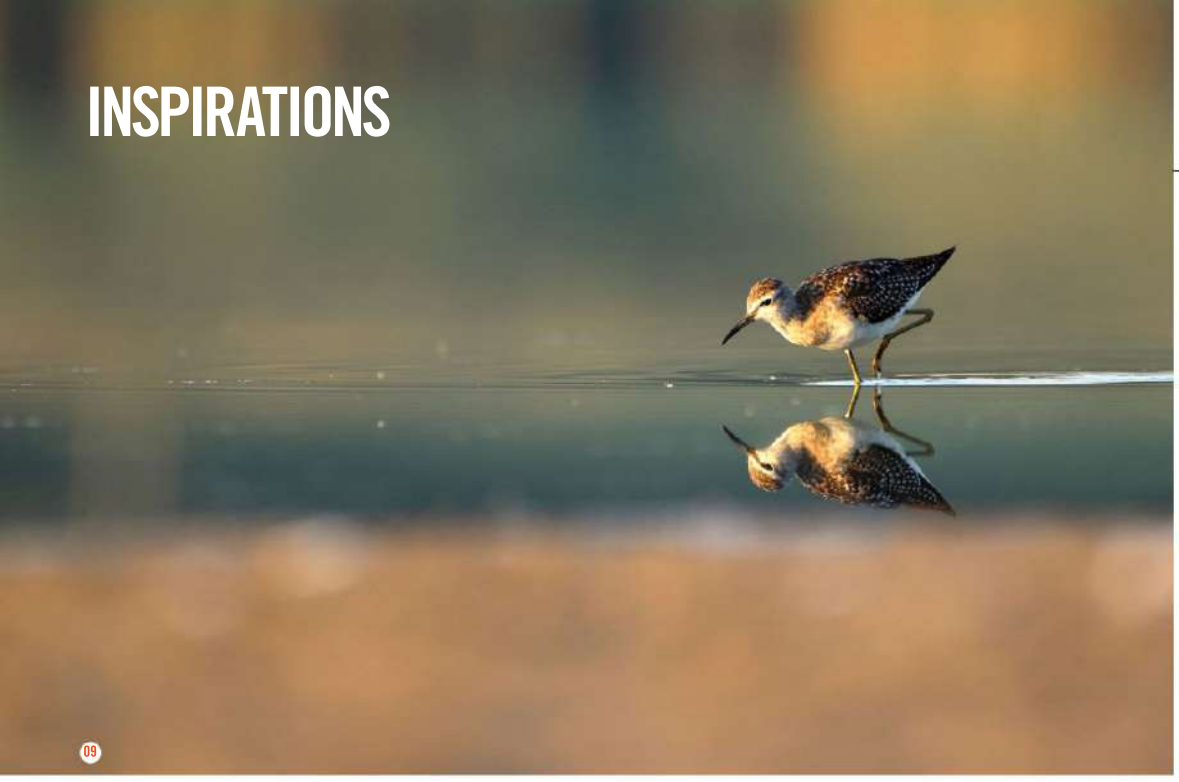
Marco's caught a brilliant expression on this young boy's face looking directly at us. We like the use of the sticks he's posing with, and his hands in the foreground, which both act as a lead-in line – and have been blurred with a wide aperture, so your eyes are drawn to the focal point of the face. The wider 35mm focal length also helps add a little context by including some of the surrounding location.

Lens	Canon EF 35mm f/2 IS USM
Exposure	1/800 sec, f/2, ISO200

08 AUTUMN TALE BY CLEMENTINA CABRAL

This is an outstanding autumnal portrait from Clementina. We love the close-up camera angle and the lovely bokeh circles in the background from the leaves dappled in light using a wide aperture of f/2.8. The focus on her model's eyes is sharp and the background is nicely defocused.

Lens	Canon EF 200mm f/2.8L USM
Exposure	1/80 sec, f/2.8, ISO400



09

Photocrowd

All the images in this gallery were entrants to the *PhotoPlus* 'beautiful depth of field' competition hosted on Photocrowd – a website where a public vote on the best-liked images is pitted against expert opinion. To enter our current contest, and vote on your favourite photos, simply visit www.photocrowd.com

09 SILENCE BY DORU SPAC

Doru's captured an excellent sandpiper shot with it bathed in a fantastic golden light and moving towards the camera, creating strong eye contact. He's also managed to get down low to be eye level with his subject for a more intimate angle and this has helped him achieve a mirror reflection of his subject in the water. He's also blurred the background out beautifully with a wide aperture of f/6.3 at a long focal length of 600mm.

Lens	Sigma 150-600mm f/5-6.3 DG OS HSM I C
Exposure	1/640 sec, f/6.3, ISO800

10 RED SQUIRREL BY CHRIS ELLISON

Chris has frozen this red squirrel at a brilliant moment as it's looking up towards the camera. Getting low to the ground and eye-level with his subject has made the shot much more personal, and helped include some of the delightful forest background adding context to the shot, which he's blurred nicely with a wide f/5 aperture and telephoto zoom lens.

Lens	Canon EF 100-400mm f/4.5-5.6L IS II USM
Exposure	1/60 sec, f/5, ISO1000

10

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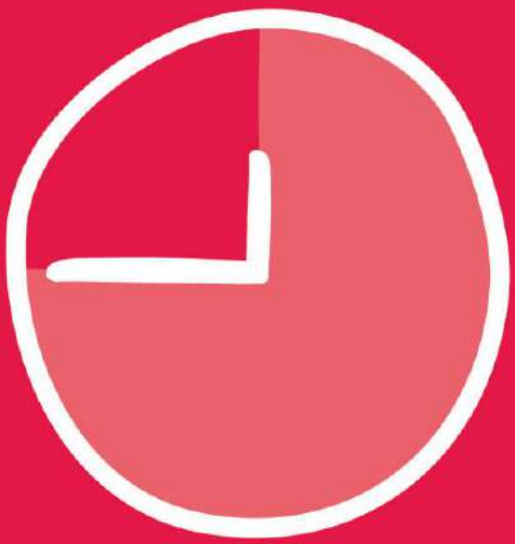

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STEP UP TO FULL-FRAME

Your complete guide to Canon's full-frame cameras, from EOS DSLRs to mirrorless, plus go full-frame for less with our used camera buying advice

If you've been into photography for any amount of time you'll likely be familiar with the term 'full-frame', which refers to the size of the digital sensor being close to that of a piece of old 35mm film. So if you're not shooting on a full-frame camera does that mean you're not getting the 'full' picture? In short, yes!

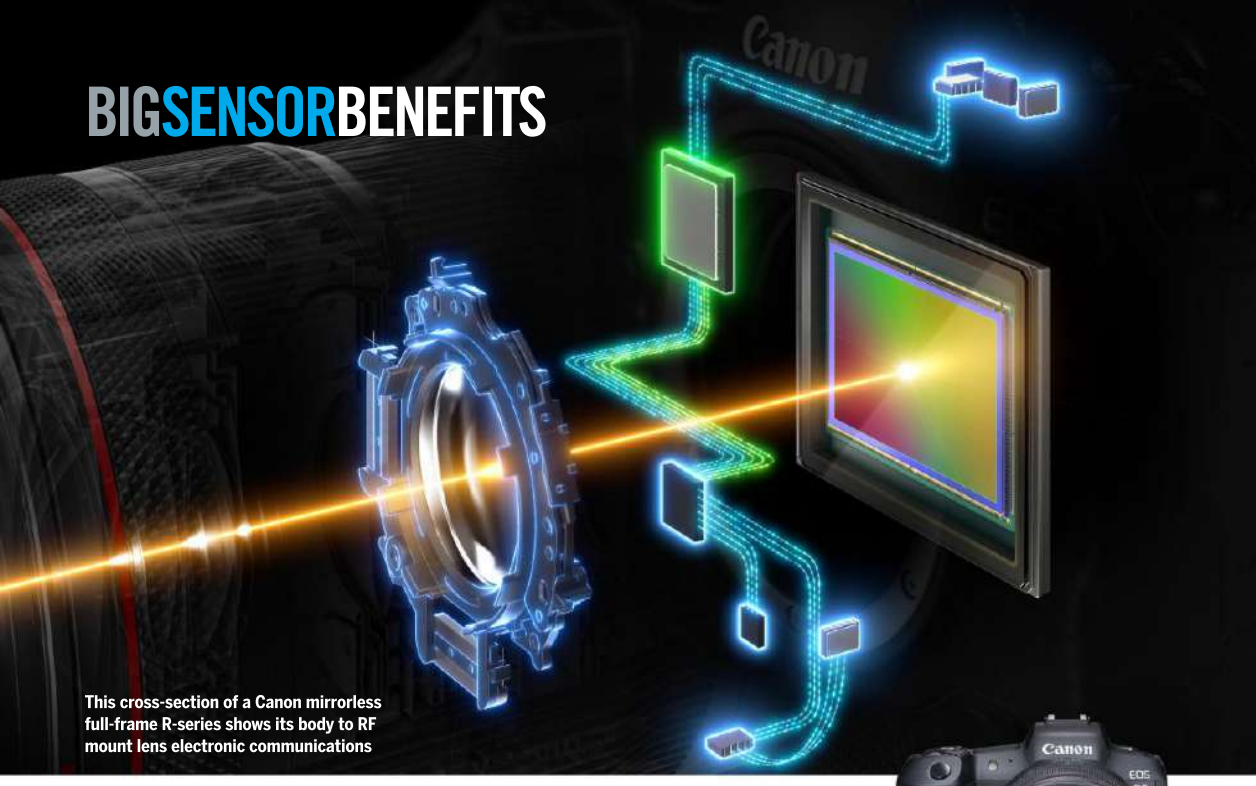
In this guide we take a deep dive into what makes full-frame so special and why professionals love to shoot with this larger digital format. Full-frame chips are huge! Canon's full-frame sensors are about 160 per cent larger than it's more budget-friendly APS-C counterparts, and over 21 times larger than a 1/2.5-inch chip, which is found in many smartphones and compact cameras.

Canon makes its own bespoke full-frame sensors for both DSLR and mirrorless cameras, varying in resolution and sensor design, some have different ways of layering or stacking the sensor, or reordering the wiring for better performance, but that's not too important here. What they all have in common is the larger format size, which paves the way for producing ultimate image quality and beautifully defocused backgrounds called bokeh.

Read on to find out all the perks of a Canon full-frame EOS and our recommendations for upgrading, even on the strictest of budgets, and how to save money with second-hand bargains without buying a lemon. Here's everything you need to know...

Canon
EOS
R6
CANON LENS RF24-105mm F4-7.1 IS STM
Canon
EOS
5D
CANON EF LENS
24-105mm 1:4 L
Ø77mm
EOS
6D
Mark II

BIGSENSORBENEFITS



This cross-section of a Canon mirrorless full-frame R-series shows its body to RF mount lens electronic communications

WHY FULL-FRAME?

Discover why you should upgrade to a full-frame Canon right now

Canon's APS-C sensors make your images appear more cropped in

The full picture

DIGITAL FULL-FRAME sensors are so-called because they're close in size to old 35mm film, hence the title 'full' frame. Full-frame Canon EOS cameras, like the EOS R5 and 5D Mark IV, have 24x36mm sensors, however Canon also makes DSLR and mirrorless cameras with a smaller APS-C sensor, measuring 22.3x14.9mm. These smaller sensors still produce fantastic image quality superior to bridge cameras and smartphones – that have even smaller sensors – but they still fall short of full-frame.

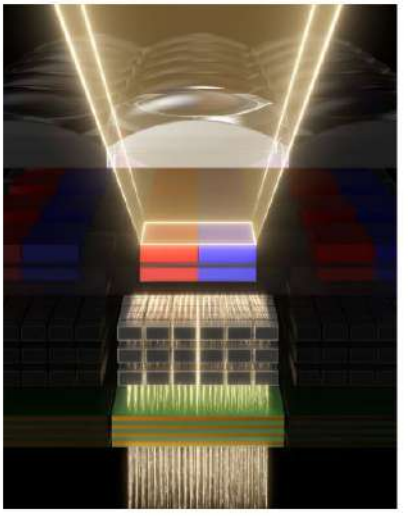
When using lenses on any of Canon's APS-C cameras, such as an EOS 90D or 7D Mark II, you'll need to multiply the focal length by 1.6x to work out the focal length equivalent, as the sensor is smaller your lenses will feel more zoomed in. Whereas with full-frame, you get exactly what the lens states on the barrel – so a 24mm focal length stays at 24mm!

Access to EF and RF lenses

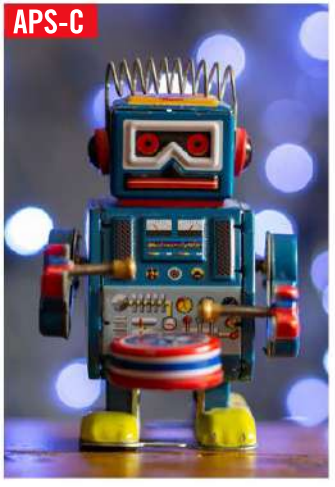
CANON'S EF-S lenses are made for its DSLR cameras with the APS-C sensor, but the EF-S lens mount is incompatible with Canon's full-frame mount, which requires EF lenses. Canon EF lenses can be used on APS-C DSLRs, meaning it'd be a good idea to invest in EF glass, so it's compatible if you upgrade to full-frame. The full-frame EF and RF lens range is also where you'll find some of Canon's best L-series lenses, providing superior image quality and features.

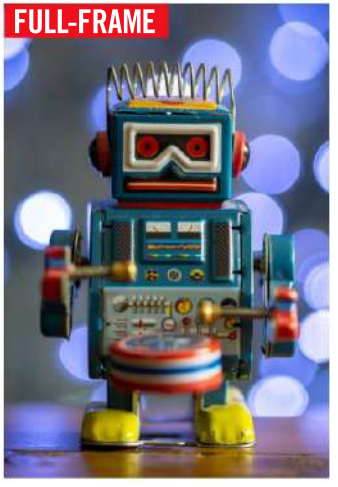
Unleash the ultimate image quality

IF YOU took a full-frame digital image sensor and APS-C chip with an identical number of megapixels, you'd see notably better image quality and noise handling in low light with higher ISOs. This is because the pixels on the full-frame chip are larger and better spaced out. The more pixels that are crammed together on smaller sensors, generally, the worse the noise handling will be at high ISO values, though noise handling is getting better with every generation of new Canon EOS cameras. Canon is able to cram high numbers of megapixels onto full-frame chips, like its 45Mp EOS R5 and 50.6Mp 5DS R, and still achieve great image quality. For our example shots above, we got the exact same composition of a pocket watch mechanism with a Canon EOS APS-C camera and Canon EOS R full-frame, both at ISO12,800 and you can see the image from our APS-C camera has much worse noise handling.



The photosites on full-frame sensors have more room to breathe, leading to better high ISO noise handling





Better bokeh

BOKEH IS the Japanese word (bow-keh) we use to describe the aesthetic of out of focus areas in a photograph, including the blurriness of the image. Bokeh can also be used to describe the out-of-focus balls of light in a defocused background. It tends to be more obvious in portrait and macro photography, where you're shooting with a wider aperture and a close focusing distance. It's much easier to include more of this desirable image quality on a full-frame sensor than on a cropped APS-C sensor – see how the bokeh 'balls' are much larger on our full-frame example, even though the robot is the same size. This is also the reason why it's so difficult to achieve good bokeh on cameras and smart phones with smaller sensors.

MONEY NO OBJECT

Canon EOS 1D X Mark III

The EOS-1D X Mark III is Canon's flagship DSLR, designed predominantly for sports, news, and wildlife pro photographers. It features a built-in battery grip for better ergonomics when shooting in portrait and landscape, as well as a 20.1Mp full-frame sensor (a respectable resolution) that helps keep the file sizes small, so images can be transferred easily and quickly – essential for sports and news photographers, where speed is everything. It also boasts a rapid 20fps burst rate, Wi-Fi, 4K video at 60p and a deep-learning AF system. All of this tech and premium build, of course, comes at a cost and will set you back a hefty £6999.

Give it a road test

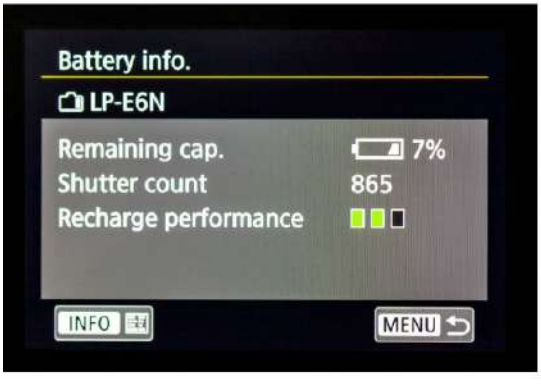
IF YOU'RE able to test the camera in person before buying a used model, take the opportunity to look for any major dents or dings and scratches on the camera screen. Don't be too worried about scratches to paintwork on the body, as this is usually just superficial, but can be a good bargaining chip to push the price down a little bit.

If you're buying from an online store, like MPB or Wex, they usually do a good job at showing the camera from several angles and listing any sort of damage. Take pictures with the camera to make sure it's all working as it should and that the mirror isn't faulty on DSLR cameras.

You could also take a picture of a bright sky and zoom in to check for dust spots, though this can be remedied if you're willing to give the camera and sensor a good clean.

WHAT TO LOOK FOR WHEN BUYING USED

Our top tips to help you avoid buying a dodgy second-hand full-frame camera



Check second-hand cameras for faults, and have a look at the battery life in the Canon menu to work out if you'll need to buy a new battery

Key checks before buying

CHECK THE shutter count of the camera, most shutters are rated to about 150,000-300,000 (although we know some pros in the wedding industry that have taken over 975,000 shots on an EOS-1D X), so try and get one with a relatively low 'mileage'. Sites like MPB and Wex show the shutter count of a camera in their listings, but if you're buying from a private seller, ask them to send you an image recently taken with the camera, you can then upload that image to a site like www.camerashuttercount.com, which will tell you the shutter count. It's also worth going into the camera menu and checking out the Battery Info, here you'll find the recharge performance of the battery, if this is poor then you'll likely need to buy a new battery.

A grey area

BE WARY of online camera offers that seem too good to be true, especially if they're coming from an unestablished or unreputable overseas seller. This could be a scam, or grey import, where the camera has been imported from overseas, meaning there's no UK warranty. They may also absent of VAT, so can seem like a good deal, but then you'll need to pay import and duty when the order arrives... Use Canon's Serial Number Checker to see if the product has been previously registered, giving it extra credibility. Also check the returns policy and if you can return it within a certain amount of time if something isn't right.

MONEY NO OBJECT

Canon EOS R5

The EOS R5 packs Canon's cutting-edge technology into a portable full-frame mirrorless body. It's not cheap, with brand new models costing £4299 and second-hand models starting at around £3200, but even for this high price we still consider it to be great value. After parting with your cash you'll be rewarded with a high resolution 45Mp full-frame chip that is capable of blisteringly fast 20fps burst shooting, and it can record 12-bit 8K Raw video too! It also comes with in-body Image Stabilisation, which when paired with the optical stabilisation of a lens can reduce camera shake by up to eight stops! Mirrorless cameras don't get much better than this.

What's in the box?

FIND OUT if the EOS camera comes with the original box, charger, cables, Canon camera strap and manuals and so on, as this will all help your camera keep its value, should you decide to resell it down the line. It's also handy to have the original charger, so you know you don't have any battery issues and don't have to fork out for a new one. Additional batteries, memory cards, lenses and accessories like UV filters can all help make it a better deal.

Having the original Canon EOS camera box, cables, chargers, accessories, manuals and software will help your camera retain its value. If bits are missing it'll also help you negotiate the price down!

FULL-FRAME EF AND RF LENSES

Here's what to look out for in EF and RF optics designed for full-frame Canon camera bodies

With over 100 lenses in the EF and RF ranges combined, there's plenty of choice for those shooting on Canon EOS full-frame cameras

Lens compatibility

CANON HAS two full-frame lens mounts for its digital cameras, EF and RF for its DSLR and mirrorless cameras respectively. Be sure to pick up lenses that fit your camera before purchasing to make sure it's all compatible. EF-S lenses won't be compatible with Canon's EF mount and EF-M lenses, for its mirrorless APS-C cameras, won't be compatible with the full-frame RF lens mount. Whether you're buying Canon or 3rd party optics, be sure they're for EF or RF mount to avoid any heartache.

MONEY NO OBJECT

Canon EOS 5DS / 5DS R

Canon's EOS 5DS and 5DS R DSLRs pack an amazing 50.6Mp resolution onto their full-frame chips to deliver stunning high-resolution prints at A0 size. This comes at the cost of a sluggish burst rate of just 5fps, but provided you intend to shoot portraits in the studio, or landscapes where a fast burst rate isn't required, these cameras would be a brilliant option. They come with weather-sealing, Dual DIGIC 6 processors and a 61-point AF system. The difference between the 5DS and the 5DS R is that the latter omits a low pass filter for even sharper images. We've found second-hand 5DS examples online starting at around £1100 and 5DS R models starting at £1579.

EF to EOS R mount adapters

WITH MORE people switching over to Canon's full-frame EOS R System mirrorless, a lot of photographers are using the Canon EF-EOS R Mount Adapter to use the EF lenses with the new mirrorless RF mount. EF lenses tend to be a bit more affordable and are more plentiful on the second-hand market with a wide range of more than 80 optics to choose from in the EF range. Plus, there's lots of 3rd party lenses, compared to Canon's newer and much smaller RF lens range. So that's certainly worth considering if you're considering going down the mirrorless route.

Full-frame RF lenses can be expensive, so the Canon EF-EOS R adapters enable photographers to use their DSLR EF lenses on the newer R-series mirrorless bodies

Holy trinity of lenses

THERE ARE three favourites that make up a so-called 'holy trinity' of Canon lenses. The trinity consists of an EF 16-35mm f/2.8L wide-angle, 24-70mm f/2.8L standard and 70-200mm f/2.8L lens. There have been various iterations of each over the years, but regardless they do a wonderful job of covering everything from super-wide angles for landscapes, to telephoto for sports and wildlife and everything in-between. If you could only pick three lenses for a shoot, these would be the go-to. They all also have a wide constant aperture of f/2.8 for beautiful bokeh. There's also a new holy trinity for Canon's RF mirrorless, which consists of the RF 15-35mm F2.8L IS USM, RF 24-70mm F2.8L IS USM and the RF 70-200mm F2.8L IS USM. However, the RF trio costs roughly 20 per cent more at £7529, whereas the EF trio will set you back slightly less at £6200. Either way, these lenses are worth looking at as a long-term investment.

The ultimate lens quality

CANON'S L-SERIES belongs to the company's top-tier of optics, with only the very best full-frame offerings from the EF and RF lens range being awarded this prestigious L for Luxury badge, and the red ring decal around the lens barrel. These are lenses that Canon deem to have superior image quality, better resolving power, faster autofocus systems and many other features, with some including Image Stabilisation, or special lens coatings. It's worth noting that there are currently no L-series EF-S, or EOS-M mount optics for Canon's APS-C cameras, so if you want the very best you'll need to go full-frame.

Only Canon's top flight optics receive the L-series label and red ring around the lens to show its premium quality and features

Canon EOS 5D Mark II around £280

CANON'S 5D Mark II was way ahead of its time when it launched in 2008 for £2299. You can now pick it up for about 10 per cent of its original price, as we've seen some used models online for £280! With a 21.1Mp sensor and dated specs, it's long in the tooth now, and we suggest finding the extra money if you can to upgrade to the 5D Mark III for better quality of life and tech improvements. But if you're on a strict budget, or would rather put your money towards lenses, the 5D Mark II is a good deal.

BEST FULL-FRAME EOS CAMERAS UNDER £1000

Got around a grand to spend on an upgrade? Get more bang for your buck with a used Canon full-framer

Canon EOS 5D Mark III around £599

LAUNCHED ALMOST a decade ago, Canon's EOS 5D Mark III is still a remarkable full-frame camera with used models starting at around £599. The 5D Mark III was *the* workhorse of many pros, offering weather sealing, access to a wide range of EF lenses, boasting a 22.3Mp full-frame sensor, Full HD video recording and dual CF and SD memory card slots. You'll also get a fantastic 61-point AF system, 6fps continuous shooting, 14-bit DIGIC+ processor, and headphone output ideal for video.

Canon EOS RP around £859 used (MPB excellent)

THE RP is Canon's entry-level full-frame mirrorless option, costing a respectable £1049 brand-new, though you can save a bit of cash going second-hand – we've found great examples on MPB around the £859 mark. Although an entry-level body there are still some stellar features, including a 26.2Mp full-frame sensor with Dual Pixel CMOS AF, 4K video at 25fps, a 5fps stills burst rate, a Digic 8 processor, Wi-Fi and Bluetooth all in Canon's most portable full-frame mirrorless body.

Canon EOS 1D X around £1000 used

ANNOUNCED BACK in October 2011 the EOS-1D X was Canon's flagship camera for more than four years. It boasted state-of-the-art technology and features, like up to 14fps shooting, 18.1Mp full-frame sensor for manageable image sizes, 61 point AF system and built-in grip. We've seen used examples online for around £1000, even by today's standards the tech packed into this camera makes it incredible value for money. Canon's EOS-1D X series DSLRs are usually worked hard by busy sports and wildlife professionals, so try to look for one in relatively good condition with a reasonably low shutter count, or factor in the price of a new replacement shutter to your budget.

Canon EOS 6D Mark II around £1000 used

STILL FEATURING in the current Canon EOS DSLR line-up, the 6D Mark II is a brilliant option for enthusiasts looking to step up to a full-frame without spending a fortune and looking for a small camera body. Ideal for quality portraits, landscapes and travel, it comes with a decent 26.2-megapixel full-frame sensor, manages 6.5fps, has Dual Pixel CMOS AF, and is well connected with Wi-Fi, NFC, Bluetooth and GPS. It also has a vari-angle touch screen LCD. New bodies are only £1400 online, but good used 6D Mark II cameras are available for around £1000, if you look out for a good deal.

MONEY NO OBJECT

Canon EOS R3 £5879 (body only)

The brand-new EOS R3 full-frame mirrorless camera takes its place as Canon's new pro-level super-speedy camera, packed with more state-of-the-art technology and features than the flagship 1D X Mark III DSLR and R5 mirrorless. If you're looking to shoot fast-paced sports, reportage and wildlife photography, and have a cool six grand spare this is *the* camera to buy. Boasting a new backside-illuminated and stacked 24.1Mp full-frame sensor with Dual Pixel CMOS AF II. It also has the ability to shoot at 30fps, black-out free EVF, 6K videos at 60p, or 4K at 120p, and has an advanced Eye Control AF that lets you move your active AF point around by simply moving your eyeball! Read our big test on page 86.

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Convertibles & Cappadocia

Cappadocia, Turkey. 06:00am. 12 October 2016

Find out how David utilizes an incredible opportunity to shoot striking images of classic cars against a backdrop of colourful balloons

Lens	Canon EF 24-70mm f/4L IS USM
Exposure	1/50 sec, f/5.6, ISO3200

Be prepared. A scouting motto, but also a mantra for a successful photographic career. I can't tell you the amount of times I have changed angles entirely on a shoot, but when opportunity comes knocking for you, it is foolish not to grasp it.

I have run yearly photographic experiences shooting Cappadocia's incredible landscape since 2016. I've also seen the demographic of tourists change considerably, all because of viral posts on Instagram highlighting an impossible dream – styled shoots with beautiful girls wearing flowing dresses, surrounded by a hundred balloons, bathed in luscious golden light. Alongside the salt pools at Pamukkale and the mosques in Istanbul, Cappadocia is a premier export for Turkey's tourism industry.

The desert landscape is made of layers of sedimentary rock, the fallout from no less than three volcanos. Erosion over the millennia has caused unique shapes to form as the sediment erodes at different speeds. This causes spires, mushrooms, caves, chimneys and many other shapes to form, the caves being inhabited right up until the 1950s.

After a fantastic shoot from the skies earlier in the week, my group and I spent one of the last mornings at one of the balloon launch sites. With upwards of a hundred balloons launching into the sky every morning, each company is given an allotted take-off location, and these make great places to shoot balloons and soak up the excitement. We start with a low-light shoot by arriving early, at around 6:00am. With deep blue skies and the last few remaining stars, the flickering glow of burners lights up the rock faces of the Rose Valley. Our cameras are set to ISO3200, apertures are set wide at f/4 in Aperture Priority, shutter speed is slow at 1/80 sec, and we're using a cool white balance (4500K). The balloons are inflated by firstly blowing cold air into the parachute, with the burner and basket lying on its side. Then the burner is lit and there's about five minutes before the balloon lifts and it starts to right itself. We keep to the sides, firing off more than enough frames to capture the moment.

The balloons are airborne. Smiles, waving, and a lot of excitement surround us, but there's almost too much to take in. One of my favourite approaches is to swap to a long lens and keep my eye on the surrounding rock faces. Low flying

"The balloons are airborne. Smiles, waving, and a lot of excitement surround us"

balloons can silhouette perfectly against the jagged rocks; any lower and they will surely pop! The Canon EF 100-400mm f/4-5.6L IS is perfect for this. Again, keeping the ISO high is a good move. The light has lifted, so I drop it to ISO1600.

To our left I can see three brightly coloured classic cars on top of a small ridge. We wander over and it's here that the fun really begins. Three shoots are going on, all to a backdrop of colourful balloons. A wedding shooting with a red Cadillac style vehicle, some friends with a blue convertible, and this incredible pink two-door open top. All three shoots are Chinese, some with pro photographers, some with mobile phones. The bold colours and shapes make it eye-catching.

I'm poised, now armed with my EF 24-70mm f/4L, waiting for the right array of balloons to drift into the backdrop. The girl in the pink car looks towards the sky – I frame the scene at 50mm, a wider f/5.6 aperture softly blurs the balloons. The arrangement is absolutely perfect. Moments later a girl waves at the passing balloon and the passengers wave back.

Sod running around at night, light painting in the dusty desert for a living. This really is travel photography at its most perfect.

NEXT MONTH LAKE DISTRICT

DAVID CLAPP

Canon professional photographer

DAVID CLAPP FRPS has been a full-time professional photographer for the last 15 years and leads global workshops. An RPS judge, he undertakes commissions worldwide, works for Canon UK and is represented by Getty Images. Visit **www.davidclapp.co.uk** for a portfolio of inspiring work and information on workshops.

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CanonSkills

Sharpen up your photography skills with our all-new photo projects and expert guides

Dan Mold
Technique editor
dan.mold@futurenet.com

Welcome...

ALTHOUGH THE evenings are drawing in there's still plenty of time in the day to get fantastic shots. James has been taking striking portraits even in the harsh midday sun – on page 44.

Don't let the shorter days deter you from getting creative with your Canon, get to grips with ISO on page 48 and discover how you can keep shooting in very low-light situations.

On page 52, in the penultimate instalment of our landscape photo series, we run through lens options and how your focal length has a drastic affect on your framing and compositions.

If you'd rather stay warm and cosy indoors and brush up on your editing skills we've also got you covered. Find out how you can use Range Masks in Lightroom Classic CC to speed up your workflow (page 54), make speedy B&W conversions in Photoshop CC (page 56) and turn a fun montage of images into a contact sheet with Affinity on page 58.

New projects with video guides

Follow our Canon camera walkthrough guides and Photoshop editing videos

44 Perfect portraits
How to take great portraits by manipulating bright sun light

54 Lightroom Classic CC
Unleash the power of Range Masks for faster and precise editing

48 Get to grips with ISO
Learn all about ISO and how you can use it for low-light pictures

58 Affinity Photo
Craft a fun vintage contact sheet with Serif's Affinity Photo

52 Landscape lenses
Find out how your focal length affects your composition

56 Photoshop CC
Create perfect B&W photos with Profiles in Adobe Camera Raw

VIEW THE VIDEOS

WHENEVER YOU see this icon you'll find an accompanying video to watch online so you can follow along. You can view the videos on a smartphone, tablet or computer. See the links on the project pages.

THE MISSION

Shoot portraits in sunlight using lighting skills, with flash, reflectors and scrims

Time needed
1-2 hours

Skill level
Intermediate

Kit needed
- Flash
- Umbrella
- Light stand
- Reflector

Place in the sun

James Paterson teaches you to tame bright sunlight falling on your subjects by utilizing some key skills to take super sunny portraits

One of the golden rules for portrait photography is that you shouldn't shoot people in direct sunlight. Without clouds to diffuse it, the light from the sun is very hard-edged. We're likely to get strong shadows over the face, squinting subjects and greasy hot spots on the skin. As such, many photographers would put the camera away, wait for cloud cover, or come back at the magic hour. However, the sun can be a wonderful source if we know how to work the angles and manipulate the light.

The main challenge with direct sunlight is the strong contrast it creates in our subject. The difference between the brightest and darkest part of the subject is so great that the shadows can look impenetrably dark. We need to find a way to reduce the contrast, by lifting the shadows or reducing the highlights – or doing both.

There are several ways we can achieve this. For the above shot, we used an off-camera flash. In this sense we can think of the sun as a secondary light source. Our subject has her back to the sun, so it's hitting the edges of the figure and creating bold highlights. From here, we need to lift the front side of the subject with a flash. We'll explain how to do this, and explore a few more options for sunlit portraits over the next pages…

ON LOCATION USING FLASH LIGHT IN THE SUN

Set up a flash in tricky midday conditions for bold portraits under the beating sun

01 FLASHES WITH SUNLIGHT

Some might think of flash as a tool to use for extra light in dim conditions, but bright sunlight is one of the best times to bring out a flash. The flash gives us lots of creative options, as we can use it to create dynamic cross-lighting like this, or gently fill in the shadows for a more natural look.

02 CROSS LIGHTING

The key to shooting portraits in the sun is to reduce the contrast over subjects. The flash lets us do this by filling in shadows. Our subject has her back to the sun, so it creates bold highlights along the edge of her figure. Positioned opposite, the flash lifts the shadows on the face and body.

03 EXPOSE FOR SUNLIGHT

The sunny f/16 rule can help work out a manual exposure. This says that in bright sunlight if your aperture is f/16 and ISO is X our shutter speed will be 1/X sec. So at ISO100 we'd need 1/100 sec. At these kinds of exposures, our flash will need to be at or near to full power.

04 PREVENT SQUINTING

Whether shooting with a flash or using a reflector, a problem you'll often face with portraits in bright sunlight is squinting subjects. Try asking your subject to keep their eyes closed or look down, then give them a '3... 2... 1...' countdown to briefly open their eyes for the shot. Alternatively, sunglasses can be a useful accessory!

05 OVERHEAD SUN

It's often said that at midday the sun is directly overhead, but because of the tilt of the earth it's never directly overhead (except for twice a year on the equator). As such, there's always a slight angle to work with, even at noon, so you can position your subject with their back to the sun so it acts as a 'kicker' light, or facing into it.

06 UMBRELLAS AND MODIFIERS

Much like the light from the sun, a bare flash head produces hard-edged light that isn't usually suited to portraits. With fill-flash it can result in awful double-shadows that criss-cross the face. Any light from a small source is hard-edged, so we need to enlarge the light source with a modifier like an umbrella.

TOP TIPS CREATING BETTER SUNLIGHT

Make the sunlight work for you with these simple lighting tips and tricks

ON-CAMERA VS OFF-CAMERA FLASH

An off-camera flash like the Godox AD-300 Pro used here, gives you greater flexibility than a hotshoe-mounted Speedlite, as you can place it where you like and use modifiers like umbrellas. Of course, off-camera flash means more work as you'll need a light stand and wireless trigger, which isn't always practical. On the other hand an on-camera Speedlite can still be very useful – especially for simple fill flash – as its position on the same axis as the lens means it fills in the shadows, as seen from the camera position.

01 EMBRACE THE SUNLIGHT

Why not embrace the hard light look? Ask your subject to turn their face to the sun and lift the chin, so that the eye sockets are not in shade. Look for butterfly lighting under the nose (where the shadow cast by the nose forms a butterfly shape).

02 USE FILL FLASH

We can use a flash to gently fill the shadows on a sunny day. Our flash should be close to the same angle as the camera. A hotshoe-mounted Speedlite can also work well. Try using the flash in ETTL mode and Spot metering to set the exposure off the face.

03 LOOK FOR NATURAL BOUNCE

Look for sunlight bouncing off bright surfaces, like white walls. Bring the subject's face in close to the surface, and it'll act like a secondary light source to fill in the shadows. You could also use a white reflector for similar results.

04 SCRIM IT

A scrim can be any semi-translucent material that we use to partially block the sunlight, like tracing paper, a shoot-through umbrella, or the diffusion panel from a 5-in-1 reflector like this here. Position the scrim between subject and sun to diffuse the light.

05 MAKE A SPOT LIGHT

A reflector is mostly used to lift the shadows under the chin, or as a subtle fill light source, but it can also give you a spot light effect. Ask your subject to stand in the shade, then bounce a beam of sunlight onto them with the shiny gold or silver side of a reflector.

06 LOOK FOR OPEN SHADE

There's different kinds of shade. The best for portraits is usually open shade, in spots under high trees or in doorways. We're looking for areas out of direct sunlight, to avoid top lighting, but with plenty of bright, reflected light to gently fill the shadows for balanced light.

TOP TIPS EDITING YOUR SUNLIGHT PORTRAITS

Hard-light portraits shot in sunlight will often benefit from subtle retouching in Photoshop

01 RETOUCH THE SKIN

Hard sunlight portraits tend to require more retouching, because the hard light more clearly shows pimples and rough patches of skin. To fix this, open in them Photoshop and make a new layer then grab the Spot Healing Brush tool, set it to 'Sample All Layers' then paint to remove small any small imperfections.

02 REDUCE HOT SPOTS

Direct sunlight can create oily-looking hot spots on skin. Make a new layer, then grab the Brush tool, hold Alt and sample a nearby skin colour. Hit 3 for 30% brush opacity, then paint over the hot spot. Try reducing the layer opacity a bit, set the blend mode to Darken and add a touch of noise with Filter>Noise>Add Noise.

03 TRY A MONO CONVERSION

Portraits in sunny conditions tend to work really well in black and white, as there's usually plenty of bold contrast and texture, features that both lend themselves well to a monochromatic look. Convert to mono in Camera Raw, or Lightroom, using the B&W Mixer panel, then try darkening the blues for a bolder sky.

TOP TIPS HIGH SPEED SYNC FLASH LIGHT

Want to shoot in sunny conditions with a flash, but still blur backgrounds?

WHEN SHOOTING flash-lit portraits in sunlight it can be tricky to blur backgrounds. The problem is our shutter speed which, when coupled with a flash, is often restricted to a max flash sync speed around 1/200 sec. If we use the sunny f/16 rule (page 45), then with a shutter speed of 1/200 sec, even if we drop to ISO100, we could only open the aperture up to f/11, which isn't wide enough for a shallow DoF (as the inset image below shows). The solution is to use a flash capable of high speed sync. This pulses the flash, enabling higher shutter speeds and wider apertures (1/4000 sec with aperture f/2.5 in the shot on the right). There are catches – camera and flash have to be compatible, and it reduces the max output of the light.

ISO400, f/2.5, 1/6 SEC

THE MISSION

Understand the role ISO values play in the exposure triangle and how they affect image quality

Time needed
One hour

Skill level
Intermediate

Kit needed
- Kit lens
- Tripod

A shot in the dark

ISO values can seem scary but don't let them haunt you any longer! **Dan Mold** shows how to use ISOs to achieve sharp shots in low light

There are three main parameters that make up your camera's exposure: aperture is the diaphragm of blades inside the lens that open or close to let in more or less light, then you have how long the shutter is open for, shutter speed, and lastly you have ISO values.

ISO stands for International Standards Organisation, the company that standardized values of light sensitivity for rolls of camera film back in the day.

In modern digital cameras, ISO has a similar function, but you don't have to switch rolls of film to achieve different ISO speeds as digital cameras allow you to do all of this at the press of a button.

ISO determines how sensitive your camera's digital sensor is to light. A low ISO value, such as 100 (the baseline on many Canon EOS cameras) is a low sensitivity settings, so will take lots of light to create a good exposure, but it does provide the 'cleanest' images and best quality. You can however crank up the ISO value to a much higher value, say ISO25,600. This will make it much easier to achieve a good exposure in very low-light environments, but at the cost of introducing digital noise, reminiscent of film grain, and some softening details. Think of ISO a like the gain control on an amplifier, it will boost the signal, but distortion increases as a result.

In this project we'll go through everything you need to know about ISO, and noise reduction, so when you're out shooting next, you know exactly which ISO setting to use.

UNDERSTANDING ISO AND FILE TYPES

Don't let these sensitivity settings spook you any longer...

01 WHEN TO SHOOT IN JPEG MODE

JPEG files are very small, compressed and have in-camera processing applied. This means they're more manageable, easier to share when you're in a hurry, but really hinder your ability to edit them efficiently, as much of the exposure data is lost.

02 WHY RAW FILES APPEAR 'WORSE'

Unlike JPEGs, Raw files don't have any in-camera processing applied (even noise reduction), so you need to apply this yourself to your desired amount when editing. Raw files start off looking worse than JPEGs, but end up looking far superior when edited.

JPEG, RAW AND YOU

Make sure you understand the difference between a JPEG and a Raw

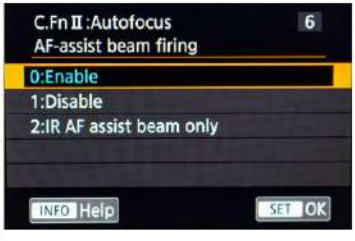
CANON'S LATEST cameras give you plenty of JPEG and Raw image quality options. JPEG stands for Joint Photographic Experts Group, the group that created the now standard digital image format. Raw, on the other hand, isn't an acronym, it literally means the 'raw' data straight out of the camera as it isn't compressed or processed in-camera. On our Canon EOS 6D Mark II body a large JPEG file was just 1.4MB, while the highest quality Raw file was 24.7MB, so you have more exposure data to play with when editing.

STEP 1 EXPAND YOUR ISO

Canon cameras usually have hidden ISO values. On our 6D Mark II we went into the Shooting Menu (red camera menu) and chose ISO Speed Settings, then went into ISO Speed Range and set the lowest to L(50), which is a full stop lower than base 100. We set the Maximum to H2(102,400), one and a third stops more than the native ISO40,000 tops out at – it's a great way to give yourself more shooting options. It's also worth opening your aperture as wide as possible and using a tripod or monopod as well as Image Stabilisation to get a sharp image. If you're shooting handheld boost your ISO until you have a shutter speed of 1/100 sec to give yourself a decent chance of capturing a shake-free shot.

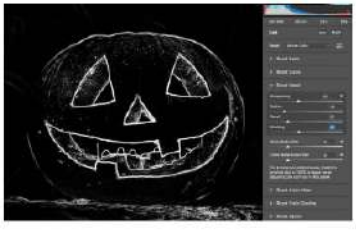
STEP 2 GET SHARP FOCUS

As our subject had a bright light source inside of it in the way of some candles, there was enough available light to easily autofocus on the face of the pumpkin. However, if you're not as fortunate, you could use an LED panel or the light on your smartphone to light up your subject, so it's bright enough for the focus to lock onto. It's also not a bad idea to light your subject with an LED panel for the final photo either. Another option is to enable the AF-assist beam on your camera, which fires out light from the camera to help it focus in the dark. On our 6D Mark II we had options to switch the standard beam on as well as the Infrared beam, which is invisible to humans and more subtle, ideal for low-light scenes at music gigs and weddings.



STEP 3 IN-CAMERA NR

Noise reduction can be applied in-camera by using the High ISO Speed NR, which is only applied to JPEG images. Here, you can set the processing to Low, Standard or High to smooth out digital noise in shots taken with a high ISO value. There's also a Multi Shot Noise Reduction mode, which merges four consecutive images to create a JPEG too. Another option is the Long Exposure Noise Reduction mode, this works for Raw and JPEG files on exposures longer than one second. The camera takes a second image with the shutter fully closed for the same length of time as your initial exposure. So if you're shooting for 1 sec, you'll have to wait an extra 1 sec for the NR to be processed, or 30 secs if your exposure time is 30 secs etc.



STEP 4 TURN DOWN THE NOISE IN POST-PRODUCTION

Open your Raw image into Photoshop and it will automatically be loaded into Adobe Camera Raw, here you'll want to go over to the Noise Reduction tab in the Detail panel. You can choose whether to ramp up Noise Reduction or Color Noise Reduction, which will smooth out details to hide some of the graininess, though you can add definition back in using the Detail sliders. Another trick is to use 'masking' when applying your Sharpening in the Detail tab. Hold Alt as you drag the Masking slider to the right and you'll see the image become black and white (above) which means only the white parts will then be sharpened, meaning it's a great way to avoid emphasizing any background noise.

THE MISSION

Use different focal lengths to change the composition of your landscapes

Time needed
30 minutes

Skill level
Beginner

Kit needed
- Super wide-angle
- Wide-angle lens
- Standard lens
- Telephoto lens

Lenses for landscapes

In the fifth part of our landscape photography masterclass series, **Dan Mold** runs through the different lenses for capturing lush vistas

Having a good quality lens is arguably more important than a good camera body. This is especially the case when it comes to landscapes, as features like 4K video, high burst rates and in-body stabilization aren't hugely essential, however a super sharp and fast lens are.

While landscapes are synonymous with wide-angle lenses, rules are made to be broken, and, indeed, standard focal lengths and even telephoto lenses can produce outstanding results. In fact, many working Canon professionals favour telephoto lenses for landscapes over wide-angle optics, as your focal point is more easily lost within a wider field of view.

The focal length of your lens is easily explained: the lower the number, like 16mm, the wider the field of view. While the higher the number, like 200mm, the narrower the field of view and more telephoto the optic is.

Note when using full-frame lenses on Canon's APS-C bodies, as these have a crop factor of 1.6x, so you need to multiply your focal length to get it's equivalent focal length. Meaning that a 16mm lens on an APS-C EOS 90D would become 26mm, and 100mm would become 160mm and so on.

In this project, we run through how different focal lengths affect the scene in front of you and the lenses you should consider adding to your kit bag to have every focal length covered.

QUICK TIP

Teleconverters like Canon's EF Extender 2x II can extend the focal length of your lens. A 2x converter is called a 'doubler', because it doubles the focal length of the attached lens. However, they also reduce light hitting the sensor by a full stop at 1.4x and a whole two stops at 2x, so a 100mm f/2.8 lens would become a 200mm f/5.6 with a 2x converter. The extra glass also reduces image quality, so they're only compatible with certain elite lenses that can take a slight drop in overall image sharpness.

STEP BY STEP FOCAL LENGTH EXPLAINED

Discover how the focal length of your lens drastically changes your composition

01 ULTRA WIDE ANGLE

Super wide and fisheye lenses will capture big scenes, making it possible to include foreground, midground and background. But you need to get closer, and they're prone to barrel distortion at the frame edges.

02 WIDE ANGLE

Zooming in to 35mm, we still have a wide angle of view, wider than 50mm (equivalent to what the human eye can see), although we lose much of the barrel distortion seen at super-wide focal lengths.

03 'STANDARD' FOCAL LENGTH

50mm is often called 'standard', as it has a similar angle of view as the human eye, meaning images look more natural. Anything below 50mm is considered wide angle and anything above is called telephoto.

04 TELEPHOTO

Telephoto lenses help you zoom into the frame and bring distant objects into close view, so it's easy to fill the frame. Camera-shake is more easily introduced here, so image stabilization or a tripod is a good idea.

Part 5 of the series

AFTER (200mm)

TOP CANON LENSES: THE HOLY TRINITY

Three quality lenses that will ensure you have every focal length covered

01 CANON EF 16-35mm f/2.8L
This lens covers everything from ultra wide 16mm to standard wide angle 35mm, making it ideal for classic landscapes. It also has a wide maximum aperture of f/2.8 – great for those low-light scenes.

02 CANON EF 24-70mm f/2.8L
This is a souped-up kit lens for full-frame DSLRs with a versatile zoom range of 24mm wide angle and 70mm short telephoto, all at f/2.8, so it's great for everything from portraits to landscapes.

03 CANON 70-200mm f/2.8L
Some landscape scenes work best when you zoom in with a telephoto lens like a 70-200mm. This lets you pick out interesting scenes within the scene, and compress the perspective as well.

WATCH VIDEO ONLINE
http://bit.ly/pp_184_4

THE MISSION

Experiment with range masking

Time needed
30 minutes

Skill level
Beginner

Kit needed
Lightroom Classic CC

Top of the range

Louise Carey uses range masking for perfect exposure and colours

Creating the perfect blend of colours or the correct exposure can be tricky – especially when you have to edit around uneven tree lines, or a messy mixture of tones.

However, there's a way to make specific edits without hours of painstakingly brushing in masks. When using the Radial Filter, Graduated Filter, or Adjustment Brush in Adobe Lightroom Classic, you have the option to introduce a Range Mask into the mix.

A Range Mask gives you the ability to limit your adjustment to a certain set of qualities. There are three possibilities: Luminance, Color and Depth. But we'll specifically be looking at how to use Color and Luminance in this Lightroom editing tutorial.

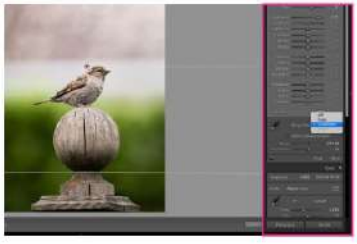
You can download the Lightroom_before.jpg image, or use one of your own shots to follow along with this step-by-step tutorial – and don't forget to check out the accompanying video for a few more tips and tricks.

HOW TO MAKE THE MOST OF RANGE MASKING

Use Lightroom Classic CC's Range Masking to shave hours off your editing time

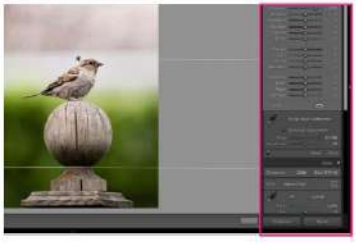
01 CHOOSE YOUR TOOL

Select the Graduated Filter, Radial Filter or Adjustment Brush tool and make your selection. We used the Graduated Filter tool to lighten the dull grey of the background, however, we wanted to ensure that the bird remained untouched.



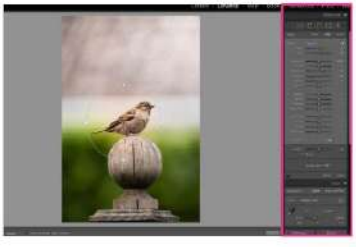
02 USE LUMINOSITY RANGE MASKS

To ensure that the adjustment tool only affected the background, we went to the Range Mask drop down menu and selected Luminance. Then, we used the Eyedropper tool to select the background, so that only those tones are affected.



03 REFINE YOUR SELECTION

Using the Eyedropper tool affects the Range slider. You can then manually adjust this slider until you're happy with the results. The larger the range, the more of your selection will be affected by the adjustments you've made.

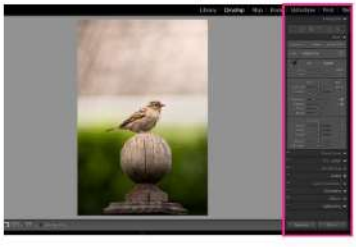


04 EXPERIMENT WITH COLOUR

Range masks can also be used with colour adjustments. We used the Radial Filter tool to boost the contrast and warmth of the bird with the Temperature slider to increase the yellows. However, this left a yellow-toned halo around the bird.

05 CREATE A COLOR RANGE MASK

To ensure that only the bird was affected, we chose a Color Range Mask and used the Eyedropper tool to select the brown tones of the bird's feathers. This meant that the neutral colours were unaffected by the colour adjustments that we'd made.



06 ADD THE FINISHING TOUCHES

Now you can finish editing by exiting the adjustment tools and going to the Basic panel. We boosted the shadows to bring out the detail in the bird and increased the overall warmth in the image subtly with the Temperature slider.

AFTER

QUICK TIP!

Range masking works best when there's plenty of contrast between the colours, or tones, in your photograph

DEPTH RANGE MASKING

If you use a newer camera, then you can experiment with Depth Range Masks as well. This will mean that you can make adjustments to a certain depth within your photo. For example, we could solely edit the sparrow, as there's nothing else on the same focal plane.

DOWNLOAD PROJECT FILES TO YOUR COMPUTER FROM:
http://downloads.photoplusmag.com/pp184.zip

THE MISSION

Learn how to apply black and white profiles and then make your own

Time needed
15 minutes

Skill level
Beginner

Kit needed
Photoshop CC

Monochrome perfection

James Paterson demonstrates how to create brilliant black-and-white images in seconds with Profiles in Photoshop's Camera Raw workspace

There are lots of tools in Photoshop and Lightroom for adjusting the look of your black and white photos and most of them are easy to get the hang of. In fact, more often the challenge lies in committing to a certain monochrome look, especially when there are so many sliders and settings to choose from. Should you go for this bold contrasty look? Or will a subtle matte effect be more suited to your photo? How about adding a vignette? Or opening up the shadows? Or dropping the blues? And so on. It's the age-old editing conundrum: stick or twist.

Thankfully there are features that can help you overcome image-editing analysis paralysis. One such tool is Profiles. They're ideal for monochrome lovers, as they give you one-click treatments in seconds, offering just the right amount of choice. As such, they're a bit like Presets, but offer greater control and flexibility. There's an excellent set of B&W Profiles in Photoshop's Camera Raw and Lightroom that gives you a range of different black and white looks.

We simply hover over them to see how they affect the image, then choose the one that works best. Simple enough, but if you want to take things further, you can go on to adjust any setting you like. If you settle on a new look that works, you also have the option to save it as a new profile, ready to transform other photos into black and white stunners with a single click.

DOWNLOAD PROJECT FILES TO YOUR COMPUTER FROM:
http://downloads.photoplusmag.com/pp184.zip

STEP BY STEP BLACK-AND-WHITE PROFILES EXPLAINED

Learn how to use the B&W Profiles in Camera Raw and Lightroom, then make one of your own

01 OPEN INTO CAMERA RAW

Navigate to your image in Adobe Bridge, right-click and 'Open in Camera Raw' (or if you're in Photoshop, go to Filter>Camera Raw Filter). Go to the Basic panel and click the Profile Browser grid icon at the top right. This houses all the profiles in different sets.

02 CHOOSE A B&W PROFILE

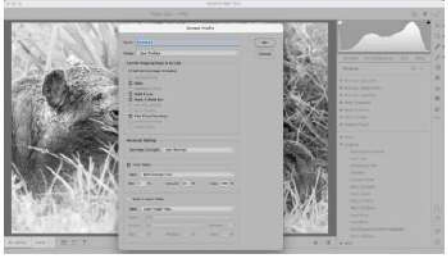
Scroll down to the B&W Profile set and hover over the profiles to see how they affect your image. Each will affect colours and contrast in various ways. We've chosen the B&W Orange Filter profile, which makes the yellow grass bright, contrasting with the hippo.

03 ADJUST THE AMOUNT

Each profile effect has an amount slider that lets you control the strength (except the Adobe Raw and Camera Matching sets, which are only available for Raws). Play with the amount (we chose 160). Once done, double-click the profile to close the browser.

04 FINE-TUNE THE LOOK

Your conversion might look done, but you can also go on to adjust any other settings to compliment the effect. Go to the B&W Mix panel to fine-tune your image. The target icon here can be used to drag over the photo to alter the brightness of colours within.



05 SAVE A NEW PROFILE

Make any other changes. We added a post-crop vignette, and darkened the bird with the Adjustment Brush. Once done, we can create a new profile. Click the Preset icon in the toolbar, then hold Alt and click the New Preset icon to open the New Profile box.

06 TEST YOUR NEW PROFILE

Give your new profile a suitable name and choose a set to save it in. You can also decide which edits to include in the profile, and which to omit. Once done, open another image then go to the Profile browser and try out the new profile on it.

QUICK TIP!

As well as black-and white-Profiles, there are Presets in Camera Raw/Lightroom for different black-and-white effects

B&W MIXER

The B&W Mixer panel in Camera Raw/Lightroom offers eight sliders that enable you to control the brightness of different colour ranges as you convert to black and white. As well as adjusting the sliders, you can also use the target tool in the panel and click-drag over parts of the image to target and adjust the colours. The target tool also allows you to affect more than one colour range at once, which tends to lead to more natural-looking changes with less break-up of pixels.

NEXT MONTH
ADD FLARE TO YOUR PHOTOS

WATCH VIDEO ONLINE
http://bit.ly/pp_184_6

AFFINITY PHOTO

THE MISSION

Add your photos to a fill border to create an analogue contact sheet

Time needed
30 minutes

Skill level
Beginner

Kit needed
Affinity Photo

Craft a contact sheet

James Paterson uses Affinity to make a vintage inspired contact sheet

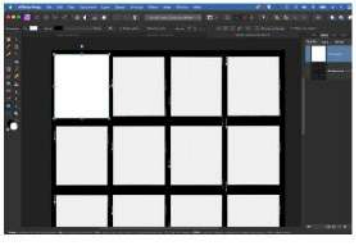
If you find it hard to choose your favourite shot from a series of similar images, then consider how this was even harder in the days of film. One of the methods used to check and compare shots back in the day was a contact sheet. This was a handy way of displaying an entire roll of film on a single sheet of paper, and in times gone by it was an important part of the creative process for photographers.

While it might be obsolete in practical terms, it's still an interesting visual effect to try. Here we'll pay homage to the contact sheet and show you how to recreate the look on a sequence of shots in Affinity Photo. We've supplied a contact sheet template, see download link below, so you can fill it with images by making use of the parent-child feature of layers. We can create rectangles for each frame and then make our shots children of these rectangles, which allows us to crop each image however we like without any overlap between frames. To finish up, we'll add a few notes and boost the tones to finish.

STEP BY STEP VINTAGE CONTACT SHEETS

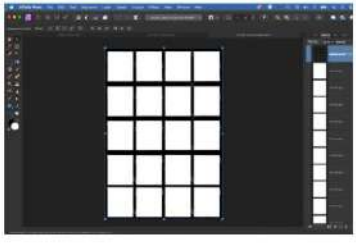
DOWNLOAD PROJECT FILES TO YOUR COMPUTER FROM:
http://downloads.photoplusmag.com/pp184.zip

Fill a film template with your own photos and learn collage skills in Affinity Photo



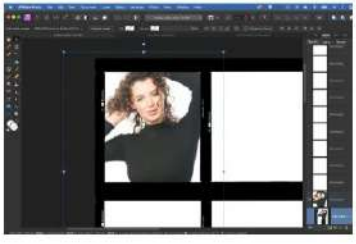
01 MAKE A BOX

Open the supplied contact_sheet.png file into Affinity, then go to Document>Rotate 90 degrees clockwise. Next, we'll create frames to snap each of our images to. Grab the Rectangle tool from the toolbar and drag a shape over the top left frame.



02 COPY THE RECTANGLES

Get the Move tool, hold Alt and drag the rectangle to make a copy. Position this over the next frame. Keep Alt-dragging to make copies for each of the frames. After, drag the bottom layer to the top of the stack, so the film border is in front of everything else.

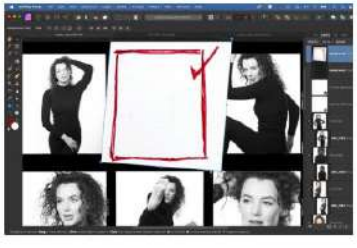


03 MAKE A CHILD

With the Move tool, click on the first frame to select the relevant layer. Pull a shot into Affinity. It'll appear as a layer above the rectangle. Drag the image layer on top of the rectangle, then drag to the right – the shot become a child of the shape layer.

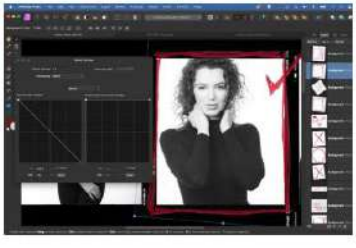
04 FILL THE FRAMES

Now the image layer is confined to the rectangle, we can drag the bounding box to resize it to fit how we want. Highlight the next frame and drag in another shot – repeat. Continue in the same way to fill all the frames, varying the crops as you go.



05 COPY THE NOTE

Highlight the top image layer, then click the Adjustment icon in the Layers panel and pick Black and White – adjust the colours to suit. Next, open contact_sheet_notes. Use the Rectangular Marquee tool to select one of the shapes, then copy and paste it in.



06 BLEND THE NOTE

Use the Move tool to position and resize the note over frames, then click the cog icon to open the blending box. Drag the black point on the Source Layer Ranges down to the bottom to fade out the whites, leaving the red.

QUICK TIP!
When resizing layers and other elements hold down Shift to preserve the proportions and prevent stretching

USE ADJUSTMENT LAYERS

Adjustment layers affect all the layers below them in the stack, so they're a great way to add an effect on top of lots of layers in a multi-image document, like our contact sheet. We've added a black and white adjustment to enhance the old-school feel. Of course, we can also use several adjustment layers in combination if we like, so we could add a colour tint with Colour Balance, or boost contrast with Curves. Each adjustment layer remains independent from all the other parts of our image, so we can edit the settings at any time by double-clicking the layer.

NEXT MONTH
MAKE COMPLEX CUTOUTS WITH CHANNELS

CHRISTIAN ANDERL

Few photographers have undergone the career path changes that Christian Anderl has experienced in his working life. But of far greater impact are the life challenges the Austrian-based portrait photographer has learnt to overcome, as Keith Wilson finds out…

01 ALAMANDE BELFORTS

Lens	Canon RF 28-70mm F2L USM
Exposure	1/125 sec, f/2.5, ISO100

PHOTOGRAPHY WAS not Christian Anderl's first choice of career. Among his seven previous jobs were roles in hotel management, architecture and a host on Austria's leading radio station. He also had a stint in military service. Now firmly established as one of his country's best-known portrait photographers, does Christian think any of his former jobs had a positive impact on his photography? "All of them did in one way or another," he replies. "Interesting photographs tell interesting stories, so I guess everything you go through, learn or experience can only improve your photography and your ability to tell better stories."

Of greater significance was the day nearly 10 years ago when a doctor told him that he might not have long to live. Christian was in his mid-30s when he was diagnosed with testicular cancer in 2012. As you would expect, this news provoked a lot of soul-searching questions, and at a time when his photography career had barely started. "If a doctor once told you 'it's good to have you here, otherwise you'd only have one year to live', a few things suddenly go through your head," he says. "Why am I actually doing all this? How do I contribute something important? What else do I want to do before it's really over?" Today, Christian

02 DENNIS	
Lens	Canon EF 24-70mm f/2.8L USM
Exposure	1/100 sec, f/18, ISO100

03 MANUEL RUBEY	
Lens	Canon RF 28-70mm F2L USM
Exposure	1/125 sec, f/2.8, ISO100

04 AINWEAR	
Lens	Canon EF 70-200mm f/2.8L IS II USM
Exposure	1/200 sec, f/2.8, ISO100

can look back on a decade with plenty of impressive achievements, including becoming a father to two sons. And his passion for photography remains stronger than ever…

How did photography initially begin for you?
It started when I was a kid and saw a director on TV explaining how he is looking for frames with a little piece of cardboard with a hole in it. I immediately grabbed a piece of cardboard, cut out this frame and was 'taking pictures' without a camera! Why didn't I learn and just make it my job in the first place? I guess because everyone told me 'Photography as a profession is dead.' Guess what, 35 years later they still tell the same story.

Was there a particular picture, a camera, or other experience that helped spark your interest in photography when younger?
I remember not reading magazines, but instead looking at the photos for much longer than others were spending reading the article. My insecure, young self thought, 'I might be too dumb for reading', but later I realized that these photos were telling stories that I liked to watch. I loved to analyze light in photos, colours, stories, composition. It was just more interesting than the text.

In those early days, what type of pictures did you like taking? What, or who, inspired you?
I remember a lot of black & white fashion photography from the 1980s that inspired me. Peter Lindbergh was a massive inspiration, but basically every good photo I saw got my attention. When I was 14, I was lucky enough to get access to a darkroom and someone who was able to handle it. So, I spent my summer days in this dark, red room, figuring out how to bring a photo from the camera to the film and from film to paper.

Pretty soon, I found out that what I liked to photograph most was people. I was interested in moments, and expressions much more than any other genre. Later, I tried other genres, but kept coming back to people and portraits. That's why today my portraits focus 100% on people and expression instead of background and surroundings. I think by cutting out all the rest what is left is much more interesting.

What do you think was the main factor that influenced your decision to become a full-time

“I loved to analyze light in photos, colours, stories, composition. It was just more interesting than the text”

professional photographer?
I had so many other jobs. I tried what I was interested in. My last job was a radio host on Austria’s biggest radio station. I guess it was just about time to get out of there. My boss and I agreed on this point for the first time! There was nothing else for me to try out. I had this feeling, ‘I guess it is time now to face what you feared the most and become self-employed.’ Photography and film were the only thing I could imagine doing every single day, so I just did it.

An even bigger set of life decisions followed with your cancer diagnosis. How did you react?
My reaction to this surprised me a little. I was calm and composed, I almost asked myself if something was wrong with me. Looking back, I think stoicism helped me realize quickly that resistance, despair and fear won’t get you anywhere. Instead, focus 100% on what’s in front of you, it’s the only thing you can control that can help you get out of here.

So, I’ve been poking holes in the doctors and trying to understand as best I can what’s going on inside me and what I can contribute to get through this. That time definitely helped me stay calmer with all the decisions that came after that. A skill that can be worth its weight in gold as a self-employed photographer.

How did this news change you?
It made me calmer, which was really overdue, I guess! Other than that, I’m still the same, just celebrating a second birthday every year, reminding myself that it all could have ended nine years ago, and one day it definitely will end. I guess I just accepted death as an indispensable part of life.

How did photography help you adjust and face the future?
Photography reminded me that all of life is just a string of moments. Good moments, beautiful moments, hard moments, sad moments, short moments, long moments. In any case, moments that pass. It reminded me that we should not hold on to anything or anyone. Enjoy every moment, every person in our lives, be grateful. But don’t try to hold onto anything, because whatever, or whoever, comes into our lives will also leave. Including ourselves.

What did you decide to do?
All this encouraged me even more to just do what feels right. The expectations of others are the expectations of others. And just because someone can’t imagine your plan working, doesn’t mean it won’t work. I decided to create and inspire others on their own way in creativity, self-employment, life, using my photography, but also by teaching others what I learned along the way. Since then, I have become a father to two amazing sons, started two online businesses, built a team and had the most successful time of my life. I just decided to not stop creating. Ever.

When shooting portraits for Movember calendars how did you ensure there was enough variety as well as technical and stylistic consistency?
I didn’t care about variety to be honest. By focusing on people and not on backdrops or lighting – I used the same light setup for all of these portraits – you can be sure variety comes from the people themselves. If we stop caring about all the variety, technical and stylistic consistency, and just focus on

05 FAMILY

Lens	Canon EF 70-200mm f/2.8L IS II USM
Exposure	1/125 sec, f/9, ISO100

06 NICOLA LOEWENSTEIN

Lens	Canon EF 70-200mm f/2.8L IS II USM
Exposure	1/125 sec, f/10, ISO160

07 VAETER CHRISTIAN LANJUS

Lens	Canon RF 28-70mm F2L USM
Exposure	1/125 sec, f/2.8, ISO100

'What should these portraits do', then the rest is easy. I've seen the *Power: Portraits of World Leaders* portraits by Platon. It's the same story: faces only, simple lighting, straightforward setup, 24mm lens to get more intimacy, end of story. The faces and expression tell the story if you focus on connecting with these people more than on the technical stuff.

How much of a successful portrait is down to the sitter's face and expression, and in the photographer's eye and approach?
It's all about the expression. And this expression is up to the photographer's eye and approach. Some people who are used to sitting in front of cameras will be much easier for the photographer, but people who feel awkward can be a hard job. That's why I think focusing on the time between the shots is much more important. If you're having a good time or conversation with your subject, the expressions will be much better than if you are focused on your lights and cameras. Or even worse – on yourself.

Studio or location? Which one do you prefer?
Studio. Same reasons – I can focus on people without distractions.

What is your preferred lighting set-up?
My most used and preferred would be a huge octabox, feathered in front of the subject, and maybe a strip light from behind, on the other side. I like it simple.

Do you have a favourite portrait lens that you use?
If I don't know where to start or don't have any ideas, I usually use the EF 85mm f/1.2 from Canon. Best portrait lens ever made in my opinion.

Which is your current first choice of camera for shoots?
I recently switched from the EOS-1D X Mark II to the R5, mainly because I also shoot a lot of video for my online courses and YouTube channel, and the video output of this camera is amazing.
I resisted moving from DSLR to mirrorless for quite some time, and I still keep the 1D X Mark II, because I love looking through a real finder instead of another monitor in my camera. But new tech is new tech, it can make your life easier.

A lot of your subjects are figures from Austrian arts and entertainment. How do you reveal something else about them beyond their public persona?
As always in portrait photography, it's about asking questions. The more

> "Photography reminded me that all of life is just a string of moments"

questions you ask, the more interest you show, the more intimacy you will get. For example, asking well-known men about their children and their life as a father will reveal unknown things. Find a subject and ask questions. Easy as that.

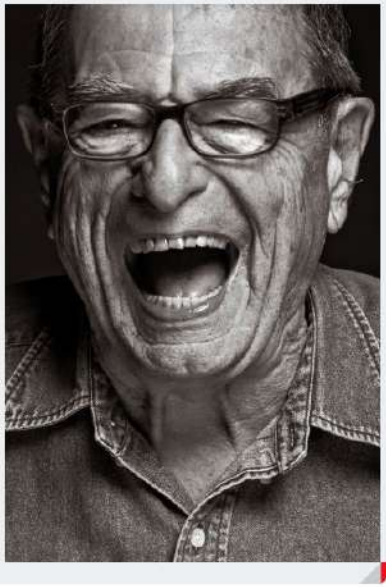
What made you come up with the idea for your *Fatherhood* project?
Since I love telling stories, doing interviews and taking portraits, this was always on my mind from the day I became a father myself for the first time. After thinking about this project for years, my first son suddenly became ill with Kawasaki disease. No-one really knows where this comes from. It looks like some viral infection at first, but keeps getting worse and worse, to the point where it becomes life threatening.
We were in hospital with him for seven weeks, including intensive care for a week. After this, he had aneurysms on his coronary artery, which made us fight for another three years. When we left the hospital and I tried to get back to my business, my first thought was, 'I guess I should stop thinking about this fathers' project and just start it.' One day later, Canon Europe called me and asked if I

STORY BEHIND THE SHOT

Try not to smile!

In trying to make a popular TV host look different to his public persona, Christian ended up achieving the opposite…

Which celebrity has provided the most memorable sitting?
I guess that was Günter Tolar, a famous Austrian TV host from my childhood. I always liked him on TV, he has such a friendly and positive vibe. When I came to photograph him, he said, "For my whole life I had to laugh and smile for photographs, I want a really serious one now." I thought, 'Well, you are friendly, smiling, positive. Serious is not your thing, but well, I'll show you.' I took the picture and showed it to him. When he saw it, he had to laugh so much, we took the most 'LOL' photo he ever had in his life! He still loves it and uses it for every interview and media appearance he can!



08 GERALD FLEISCHHACKER	
Lens	Canon EF 70-200mm f/2.8L IS II USM
Exposure	1/125 sec, f/18, ISO100
09 SMOKING ACE	
Lens	Canon EF 24-70mm f/2.8L USM
Exposure	1/100 sec, f/13, ISO50
10 VAETER LUKAS RAUSCH	
Lens	Canon RF 35mm F1.8 Macro IS STM
Exposure	1/200 sec, f/2.8, ISO50

had a project idea I could imagine shooting on a new top-secret camera (it turned out to be the EOS R). So I just said, "Yes, there is this idea…" They loved it and we started it.

How did you go about choosing your sitters for *Fatherhood*?
I posted an Instagram story, briefly explaining what I was planning, and 150 fathers filled out the attached form and wanted to join the project. So, we just started there. The process was pretty easy at the beginning. I wanted to find out where it was moving, so I just picked different types of fathers: older ones, younger ones, CEOs, bricklayers.

"Focus on people more than anything else. Learn to read them, understand them"

I wanted to see if there was some kind of 'intersection' between all of us that is independent from what we do in our life. It turned out there is. No matter what fathers do for a living, how rich, poor, genius or average they might seem at first, fathers all share the same insecurities, anxieties, love, passion, brave heart, and would ultimately give it all for their kids.

It's an ongoing project, so when and how will it end?
I have no idea! I already wanted to just finish it by shooting some more, printing a book, starting some kind of website, podcast, but then I remembered this interview with the biggest superstar I ever enjoyed doing when I was a radio host. He told me a funny and heartbreaking story about his kids during this interview, long before I had even thought about ever being a dad myself. But this story also was in my head when I started this project. It showed me, that a father is a father, no matter how famous and rich he is. So I'm thinking about contacting various other people, including this secret superstar, and maybe try to add international guests as well. Maybe the last interview could be one of my sons when he becomes a father? That would make a fabulous endpoint for this project.

Have you ever spotted a stranger in the street to pose for your camera? What type of face would make you do so?
There are so many interesting faces and

PROFILE

Christian Anderl

Professional portrait photographer

As one of Austria's leading portrait photographers, Christian Anderl is renowned for his candid and wonderfully intimate studies of everyday people, as well as national celebrities. Much of the inspiration for his work is drawn from his own personal experiences, such as his on-going *Fatherhood* project, which he began in 2018 after his young son became seriously ill with Kawasaki syndrome. Christian is also a cancer survivor and responded to his own diagnosis of the illness by shooting a succession of Movember charity calendars to raise awareness of men's health, especially prostate cancer.

Prior to becoming a professional photographer, Christian worked for many years as a successful radio presenter on Austria's broadcasting station. Now a Canon Ambassador, he is the founder of the online photography workshop platform, Shootcamp, one of the largest German-speaking photography communities for both beginners and enthusiasts of photography.

www.christiananderl.com
www.shootcamp.at

personalities out there. I even printed small cards saying, 'I want you in my project', for the *Fatherhood* project. Whenever I see a father out there that seems to be an interesting character, I just hand it to him. There is no special type of person, or face, that would make me do so. Charismatic might be a good starting point, loving can be another, funny, goofy, calm…

When not photographing people, what else do you like to shoot?
Landscapes. I love to travel, just get out in the field and take the time for a beautiful shot. Like fishing, you just might have to sit there for an hour, waiting for light, clouds and everything to be perfect. And still you might not get the shot you want. But I don't really find a lot of time for this right now. Maybe when the kids are grown up. Then I might start my landscape and wildlife amateur-career!

How have you kept busy during the COVID-19 pandemic?
I didn't really have to keep myself busy. I am a father of two and have an online business, so there was so much to do all day. The hardest part was feeling alone at home, not seeing friends and strangers, not meeting new and old people. But stoicism helps.

So, what next for Christian Anderl?
I have some ideas for the next 10 years, but for now I want to focus on finishing the already too many projects in my pipeline. Next, after *Fatherhood* could be some other series with other topics. We have so many roles in our lives, father is only one of them, and every one of these roles could make for a good book. I guess I won't live long enough to finish all my ideas. I think that I will keep creating things that are hopefully inspiring till the last day.

Your life has been like a roller coaster ride already, so what's your best single piece of advice to someone wanting to become a portrait photographer?
Only one piece is always hard. But if it is advice for portrait photographers: focus on people more than anything else. Learn to read them, understand them. Be compassionate, patient, and work on your improvement as a human being, not just as a photographer.

PHOTOSTORIES

*Photo essays from **PhotoPlus** readers and professional photographers alike*

JOIN IN THE FUN!

One of the great things about photography is being able to share your view of the world. This month one of our readers chases the sun for moody landscapes, while another heads to their local wildlife park to test their skills.

We want your photos and stories! For your chance to show off your images in *PhotoPlus*, email three to five high-resolution JPEGs, along with a brief synopsis – explain why you took the shots, the location, whether they're part of an ongoing project or a one-off shoot, and anything else unusual or interesting. Also include Canon EOS camera, lens and exposure details.

Email images and info to
photoplus@futurenet.com

Catch us online at
www.facebook.com/photoplusmag
www.instagram.com/PhotoPlusCanonMag
www.twitter.com/photoplusmag

PROJECT INFO

NAME: Stephanie Dowe

LOCATION: Kirkcudbrightshire, Scotland

MISSION: Capture glorious close to home sunsets

KIT: Canon EOS 60D, Canon EF-S 17-85mm f/4-5.6 IS USM, Sigma 10-20mm f/3.5 EX DC HSM

Instagram: @sdphotographykbt

Here comes the sun

Stephanie has been shooting sunsets at her local landscape hotspots

I live in the South West of Scotland, in the beautiful area of Dumfries and Galloway. There are great landscape photographic opportunities here, as there are many neighbouring towns and plenty of countryside. Perhaps then it's no big surprise that my main interest is landscape photography.

I use a Canon EOS 60D with a range of lenses – wide angle and standard lenses. I also use a mixture of filters, including neutral density filters, which block light, creating a perfect opportunity for a long exposure. I love dark, moody, photographs and adore creating silhouettes with stark contrast.

02

Autumn is my favourite time of year for photography… The sunsets always prove to be prominent, there are colourful leaves on the ground, temperatures drop and you get frosty mornings, chilly evenings, and rainy days, which are amazing for capturing reflections.

You cannot predict a sunset, what the colour will turn out like, the vibrancy, or even the weather. This is why you have to be prepared, be on the lookout and keep your eyes open, as you can miss a photo opportunity in a second.

I like to try and include a strong focal point in my landscapes, to draw the attention in and also balance the frame. I also enjoy experimenting with different viewpoints and angles, like shooting a subject from the side or head-on, for example. I also try to incorporate lead-in lines. These could be branches, pathways, or a wall to guide the viewer's eye where I want it to gravitate to.

I am not always fully content with my photographic work, unless I capture my image how I planned it. We all know sometimes it doesn't work that way, sometimes you have to really persevere and return time and time again. This can become tiring, but it's worthwhile. Some of my favourite photos are ones that weren't planned at all.

I have an artistic background and I believe this has helped me tremendously. For example, I know what colours compliment each other and what works well compositionally within the frame.

03

01 THREAVE CASTLE
Sunflare pokes out behind Threave Castle at Castle Douglas

Lens Canon EF-S 17-85mm f/4-5.6 IS USM **Exposure** 1/8000 sec, f/9, ISO100

02 THE WRECK OF THE MONREITH
Stephanie backlit the Monreith at Dhoon Shore with a sunset

Lens Sigma 10-20mm f/3.5 EX DC HSM **Exposure** 10 secs, f/18, ISO200

03 KIRKCUDBRIGHT BRIDGE
Stephanie shot from the harbour to turn the bridge into a lead-in line

Lens Sigma 10-20mm f/3.5 EX DC HSM **Exposure** 1/4 sec, f/25, ISO100

PhotoPlus FEEDBACK

Having a project on the go with a consistent theme is a great way to build up a collection of similar images, develop your style and fine-tune your technique, and that's exactly what Stephanie has done here with her sunset pictures. Although Stephanie's style is to go for an underexposed and silhouetted look, we think her pictures could look even better if she tried her hand at HDR photography, combining a bracket of exposures together to provide a deeper range of tones. This would add some detail to her deep shadows and should also help retain detail in the sun, which is a bit burnt out in a few of her pictures.

01

PROJECT INFO

NAME: Peter Baker

LOCATION: The British Wildlife Centre, Crawley

MISSION: Photograph foxes and other animals

KIT: Canon EOS 80D, Canon EF 70-300mm f/4-5.6 IS II USM, Tamron SP 90mm f/2.8 Di VC USD Macro

Instagram: @images3904

Wild at heart

Peter honed his wildlife photography skills at The British Wildlife Centre

This spring and summer, my neighbours told me tales of watching a fox family play in the field behind our house. After hearing this, I decided that I had to get some photos... I was up at dusk, put out dog food and had the farmers permission to sit in the field waiting. Days were spent in wait and nothing came. The British Wildlife Centre was my safety net and I went there hoping to get the pictures I was after. My big tip for this is to stay close to the keeper running the day – they have a bucket of food, meaning that their eye contact with the wildlife is strong.

I went to one of Marsel van Oosten's presentations and his four tips have always stuck with me: "What am I going to photograph? Why am I going to take the pictures? Where will I compose the pictures and when will I shoot?" I took around 350 pictures on the day, but following Marsel's advice I try to only pick out images with magical moments, these are the shots of British mammals from the day that I find have a certain X factor about them.

I'd been inspired greatly by seeing other photographer's wildlife images taken on safari. While I'm unlikely to ever go on a safari, I did want to challenge myself to still take some compelling animal portraits closer to home.

The British Wildlife Centre is very welcoming of photographers, so there were not many problems at all.

01 RED SQUIRREL
An off-centre composition makes for a great red squirrel portrait

Lens	Canon EF 70-300mm f/4-5.6 IS II USM	Exposure	1/160 sec, f/5, ISO400

02 FOX
Peter was in position for an eye-contact shot of this fantastic fox

Lens	Canon EF 70-300mm f/4-5.6 IS II USM	Exposure	1/320 sec, f/6.3, ISO400

03 WILDCAT
Peter caught this great moment of this wildcat hissing

Lens	Canon EF 70-300mm f/4-5.6 IS II USM	Exposure	1/400 sec, f/5.6, ISO400

04 HEDGEHOG
Getting down to ground-level makes this hedgehog shot much more intimate and interesting to look at

Lens	Tamron SP 90mm f/2.8 Di VC USD Macro	Exposure	1/200 sec, f/2.8, ISO640

My biggest issue was that my ideas of how to shoot the animals and where to stand didn't always come together. My solution was to take a step back, let all the enthusiasm burn for a few minutes and look for the best opportunities, as the other photographers settled down and the animals became more relaxed.

"Let all the enthusiasm burn for a few minutes and look for the best opportunities"

It was tempting to get carried away whenever an animal was visible, but I tried to ensure the background was neat, the light was attractive and my focus was placed over the animal's eyes. The keeper knew each animal's favourite spots, the route they'd likely take and informed us of some of their habits and behaviour to watch out for.

PhotoPlus FEEDBACK

We'd like to say congrats to Peter for pursuing his passion for photography and sending us these top animal shots. We think that visiting an ethical nature park or wildlife centre is a great way to not only get some animal portraits, but also boost your confidence. You also get to grips with some of the animal behaviours making their movements easier to predict. We hope Peter continues to visit his local field to try and photograph foxes in the wild, as then he'd be able to put his new skills into play and take some extra-special shots.

MYKIT

Professional photographers reveal their top six tools of the trade they couldn't shoot without

Alexander Sviridov

Canon portrait pro and digital artist Alexander Sviridov captures incredible images in his home studio and often adds a playful horror twist in Photoshop

After studying fine art for seven years, I began trying other genres such as realism, impressionism and the abstract.

I moved to Canada in 2000 and it was very difficult to find a job as an artist, but using more practical Photoshop skills I was able to get a job as a graphic designer.

In 2012 three-year-old daughter, Iris, went up to some flowers in a vase and leaned in to smell them, the natural light from the window fell beautifully and created an elegant scene. This became a much needed epiphany that I was looking for, as at this point I hadn't done anything artistically for 15 years, but from this moment I knew photography would be the answer to my creative hiatus.

I have always been a fan of the classical masters of painting, and have a keen interest in surrealism. I'm influenced by my favourite artists, such as Rembrandt, Vermeer, and Dali, combined with some of my own personal spice, I came to my own style of photography. Many of my photos are edited to appear as if they are paintings. I am constantly looking for new and creative ideas to project them into my art pieces.

While I don't specialize in the horror genre alone, often ideas will come to me with horror elements and I then have to work out how I can make the picture a reality using my camera and editing. While I love to use models when I can, usually myself or my daughter pose for the photos, because it's a fun way to spend time together.

WHAT DO I DO?

Alexander Sviridov

Instagram: @alexander_sviridov_photoart

BASED IN Ontario, Canada, Alexander has put his own stamp on fine art and horror photography, often using himself and his daughter, Iris, as models he creates a classic painterly style in his modest home photographic studio. Alexander's pictures have won multiple international photo awards in some of the biggest photo-contests, such as Trierenberg Super Circuit, 35Awards, WPE, VIPA, Photocrowd, Gurushots and Viewbug.

IN ALEX'S BAG

01

Canon EOS 6D

WEB: www.canon.co.uk

I HAVE used this camera for more than seven years and it's still going strong as my main workhorse body. It's a very light Canon EOS full-frame DSLR with a very affordable price, plus is perfect for travelling with. It has modest resolution of 20.2Mp, which is sufficient for the types of imagery that I like to create. On top of that, it has great colour rendering and low noise levels. It works well even when it comes to difficult weather conditions, such as light rain.

02

Canon EF 100mm f/2.8L IS Macro

WEB: www.canon.co.uk

THIS IS my favourite lens, because out of all the lenses that I own, this one produces the clearest and sharpest photos. It can be used for all kinds of shots, from macro close-ups, say of a person's eye, to landscapes.
The autofocus is fast and quiet and the lens is made from high-quality materials.
It's also dust and water resistant. I've been using it extensively for more than five years and it still works as if it were new.

03

Canon EF 85mm f/1.8 USM

WEB: www.canon.co.uk

I USE this lens mainly for portraits, in my opinion it's the best budget portrait lens from Canon for DSLRs. This lens is convenient to use, lightweight and compact, and it finds focus quickly as well. It also delivers pleasant soft and even bokeh.
I only use prime lenses, as I find they give the best sharpness and I don't mind moving back and forth to zoom with my feet.

04

Canon EF 40mm f/2.8 STM

WEB: www.canon.co.uk

CANON'S 40mm f/2.8 is the perfect day lens – it's super small and light, it's usually what I leave on my camera when I'm not shooting, so it's always ready to go. It gets used a lot for the digital collages I make, because it's wide 40mm focal length is better for squeezing more into a scene than my 85mm and 100mm lenses. I find it to be sharp even at f/2.8 and has high contrast with no distortion visible.

05

Godox AD200 Pro TTL flash

WEB: www.godox.com

TO LIGHT my subjects consistently, I use this handy battery operated wireless flash. The AD200 is powerful, lightweight and compact. It offers good quality for a low price. It can be used both in studio and outside. This flash can produce a very short flash duration: 1/13000 sec at the lowest power setting. I used this to take pictures of water splashing, and the quick flash froze the picture very well.

06

FotoPro X-Go tripod

WEB: www.fotopro.com

THIS FOTOPRO tripod comes everywhere with me, even my studio. The tripod is made of high-quality carbon fibre material, so is pretty light as well. It's great for wildlife, outdoor and adventure photos, as well as shooting my composite collage images, where I need to take several images that will all line up perfectly in Photoshop. It's easy to carry and the legs fold in reverse, making it compact for storage and transportation.

NEW SERIES

CANON SCHOOL

In part six of our series: We'll explain how you can use your Canon EOS to help compose perfect pictures

PhotoPlus EXPERT

MARCUS HAWKINS

PHOTO EXPERT

Marcus has been passionate about photography for more than 25 years. A former editor of our sister publication *Digital Camera*, he has written about photography and cameras for a wide range of clients, including Canon and Jessops, and uses a Canon EOS 5D Mk IV.

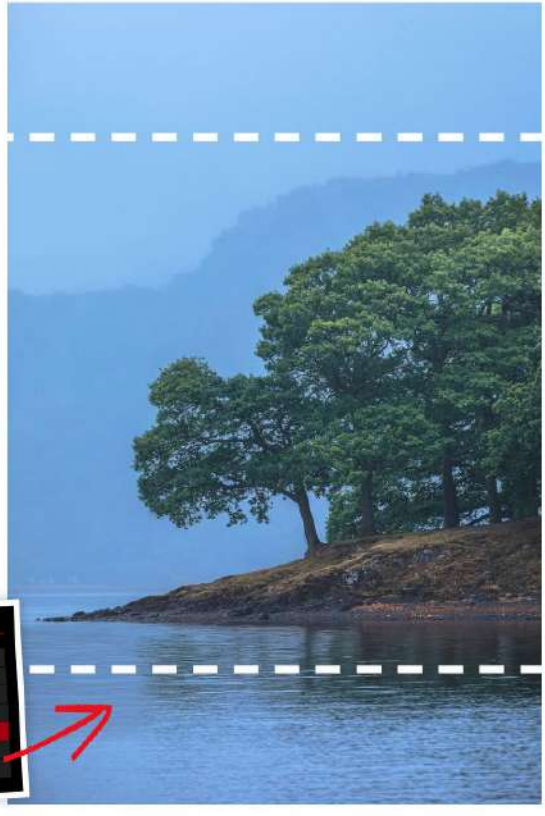
Compose yourself

Discover the camera features that can help to improve your framing and composition

When it comes to arranging the elements in a photo, the things you choose to leave out of the frame are just as important as those you include. This means that the size and shape of the frame itself is one of the fundamental choices that you need to make before you take a shot.

By default, your EOS camera records images with aspect ratio of 3:2. The aspect ratio can also affect the resolution, as anything other than the full 3:2 option will reduce the number of pixels used to record a photo.

With a JPEG, the aspect ratio that you choose is what you'll end up with when the photo is saved to the memory card and there's no going back. It's different when you shoot Raw, as the image is always recorded in a 3:2 aspect ratio. However, the rear screen or viewfinder can be set to show the selected shooting area, either masked off or outlined. The cropping info is always saved alongside the Raw, though. So, when you open an image in Raw software, such as Canon's Digital Photo Professional or Lightroom, it will be automatically cropped to the aspect ratio that was set in-camera. But you are able to reset it to the full 3:2 image or select a different aspect ratio whenever you like.



Automatic EF-S crops on full-frame bodies

EF AND EF-S lenses can be used on EOS R mirrorless cameras via one of Canon's EF-EOS adapters. While an EF lens delivers the same full-frame 3:2 view as the native RF mount lenses, an EF-S lens produces a 3:2 image that fits the smaller proportions of an APS-C sensor. So, even though it's the same aspect ratio, the image projected by an EF-S lens only fills the centre of a full-frame sensor.

To remedy this, an EOS R camera automatically crops the image to the correct size when an EF-S lens is attached, and you'll be unable to set any other aspect ratio. If you are using an RF or EF full-frame lens, you can also take advantage of the in-camera 1.6x crop option in the Cropping/aspect ratio menu.

Crop JPEGs to improve the composition

See your images in a new way by saving alternative versions on the memory card

As well as being able to crop images that you've taken in software, your camera may also allow you to resize and crop photos in-camera that have been saved as JPEG or HEIF files. You'll find these options in the blue Playback menu, although cropping is not available on some models.

Resizing simply reduces the pixel count of the image and allows you to save it as a new image at a smaller file size. That can be useful if you want to share images online when you're on location, for example. But it doesn't help with the framing and composition.

Cropping does allow you to alter the look of a photo, though, and if your camera offers post-shooting cropping, you'll be able to choose the aspect ratio, and change the size and the position of the cropping frame. You can also try rotating the frame to cut a vertical section from a horizontal original and vice-versa, and you may be able to correct a tilted image by 10 degrees to the left or right. While you'll be able to make more precise adjustments in software, the in-camera options are useful if you need to quickly tidy up an image before sharing it. And besides, trying out different crops is a useful way to develop your eye for other potential shots while you're out and about.

Experiment with different crops

You can reframe the shot using any of the main aspect ratios, as well as change the orientation

Add Cropping Information

Choose an aspect ratio based on a classic film camera

More advanced EOS cameras, including the EOS R5, EOS R6 and EOS 5D Mark IV have an additional 'Add cropping information' function available in their Custom Functions menus. This allows you to select an alternative aspect ratio from a selection of options based on popular medium-format and large-format film cameras, such as 6x6cm, 4x5-in and 6x7-in.

The main difference between this collection of aspect ratios and the ones that you can select in the main menu is that the image is always saved at the original 3:2 aspect ratio, regardless of whether you're shooting JPEGs or Raw files. Two vertical lines will be displayed on the image as a guide to the new aspect ratio, but you'll always be able to see the full image. When you open the image in Digital Photo Professional, it will be automatically cropped to the new aspect ratio, but you can choose a different option if you change your mind – and for once, this also works for JPEG images as well as Raw files (unlike JPEGs that have been saved using the aspect ratios available in the main menu). Non-Canon software such as Lightroom can also detect this cropping information, but only for images saved as Raw files.

Following the guidelines

Activate the grid overlay to help when you're composing your imagery

One useful in-camera tool that can help with framing a shot is the Grid Display function. This enables you to superimpose a selection of grids over the image that can help you to line elements up, keep vertical and horizontal lines straight, and work out where to place objects within the frame.

It's widely available across Canon's EOS range of cameras, although with some models there are fewer grids and if you're shooting on a DSLR then it may only be visible when using Live View mode.

Some advanced DSLRs, such as the EOS 90D and 5D Mark IV, enable you to show the grid in the viewfinder. To activate this, head to the 'Viewfinder display' option in the yellow Set-up menu. You may also be able to display the grid when you check your images – you'll find this option in the blue Playback menu. The grid lines aren't saved on the image, instead, they're just overlaid on the screen.

The 3x3 grid option is the most basic and, arguably, most useful option when aiding composition, because it conforms approximately to the rule of thirds. So, not only does it allow you to quickly check that your shot is level, it can help you work out where to place the horizon and the subject. By lining up the most important detail in a scene (such as the eyes in a portrait) at one of the points where the lines cross, you can create more visually interesting pictures. Obviously, there are some subjects that suit a more centred and symmetrical composition – flowers and spider webs for example – and not all pictures should be constructed rigidly according to the rule of thirds, as there's a risk that your photos can start to look too similar. But it does provide a great starting point to build from.

You can enable the Grid Display in the red Shooting menu

You may be able to view the grid during playback, too

3X3 grid

A simple overlay which allows you to place the horizon and focal point according to the rule of thirds

6X4 grid

Useful when you need more vertical lines and horizontal lines, and for avoiding unwanted tilt

3X3 + diagonals

The additional diagonal grid can help when you want to make use of leading lines and angles in a shot

Making adjustments when you shoot

Give yourself more options when it comes to editing

IF YOUR camera doesn't have a grid display, you can use the AF point array in the viewfinder as a rudimentary guide to positioning the main subject and making sure that lines in the images that should be straight, are. By lining up the horizon with the top or bottom of a row of AF points, you can be confident that you won't have to do that much in the way of corrections later on. The placement of the off-centre AF points can be used as an equally rough and ready guide to subject placement.

It's worth framing a little wider to give yourself more options when it comes to tidying up the framing during the edit. If you fancy doing a 1:1 crop later, for example, you'll lose a fair amount from the width of an original 3:2 image. Giving yourself a little more room to play with when you shoot means that you can be more confident that you won't end up trimming the subject awkwardly. Lens corrections, particularly with ultra-wide lenses, can also force details at the edge of the picture to be lost, which is something to consider when you're framing up.

KEEP IMAGES LEVEL

Check that your shots are level

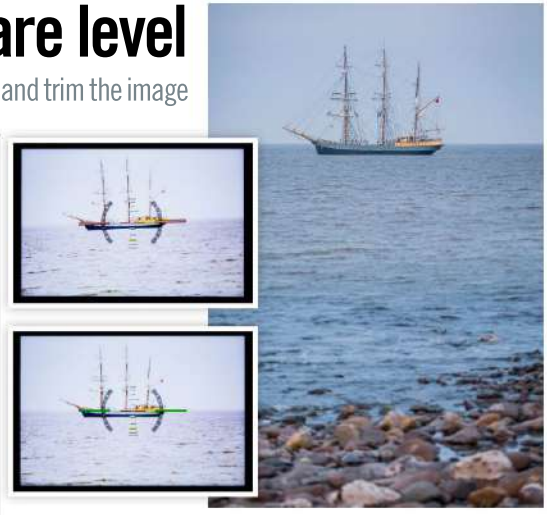
Get a level horizon in-camera so you don't have to twist and trim the image

One of the very first things they teach you in Composition School is to make sure the horizon is level. To help with this, many EOS cameras come with an electronic level that shows if the camera is tilted.

You can reveal the level by hitting the INFO button to cycle through the different info screens. It can also be viewed on the rear screen during Live View shooting or in the electronic viewfinder of a mirrorless camera.

Although it's easy enough to correct the level in post-production – it takes just a couple of seconds in Lightroom or Photoshop to rotate an image, after all – it's better to get it near-perfect in-camera. Doing it digitally, after you've taken the shot, will inevitably lead to the image being slightly cropped; plus, if you're shooting a sequence of shots that will be stitched together later in order to create a panoramic photo, then it's important to keep the camera level from the first frame to the last. Any tilt here will be exaggerated in the final image.

Not all photos need to be level. But if you are going to purposely skew the horizon to inject interest, try and make it reasonably obvious.



Scenes that contain water tend to look the worst when the horizon is slightly off. Rotate the camera until you see the green line to get it level

Get a cleaner view

Cut the on-screen clutter to compose more easily

IF ONE thing can help to make life easier when it comes to composition and framing, it's getting an unobstructed view of the image. The optical viewfinders used in Canon's DSLRs are bright and clear, but the Live View display (and the EVF in a mirrorless EOS camera) has a few advantages. For a start, they are brighter in low light and you always see 100% of the image.

Well, I say 100% of the view – with all the info displays activated, there's a lot of detail to see past. Activate the electronic level display screen, for example, and you may also get the histogram along with all the other shooting info too. You can edit the detail displayed on these screens though. Look for 'Shooting info disp' in the red Shooting menu or 'LV display options' in the yellow Set-up menu.

You can edit each display screen that is brought up each time you press the INFO button for Live View options

School tip Viewfinder grid lines

How to make the grid display easier to see

BEING ABLE to display a grid in the viewfinder of a DSLR is useful, as it allows you to check the image is level on the fly, rather than having to activate Live View and look at the rear screen. By the time you've done that, the moment for a picture may have passed.

The black lines of the grid can be hard to see though, particularly when you're taking photographs of a dark scene or shooting in low-light situations.

But here's a trick: take your finger off the shutter release button and press the AF point selection button. Not only will it make the AF points glow red, it'll also light up the grid lines too.

PART 7
Next issue: Get creative with colour using your Canon EOS camera

SOFTWARE SOLUTIONS

Our Canon expert Brian explains how to update the firmware of your camera to get all the latest and greatest features

PhotoPlus EXPERT

BRIAN WORLEY

CANON PRO

Brian is a freelance photographer and photo tutor, based in Oxfordshire. He has unrivalled EOS camera knowledge as he's been working for Canon for over 15 years, and will help you master all EOS products.
www.p4pictures.com

Make the most of macro photos

Refine macro shots while still retaining their authenticity with Digital Photo Professional

Macro pictures of natural subjects deserve special treatment to showcase the details and delights that nature provides. Canon's Digital Photo Professional is a great tool for extracting the max quality from Raw files. DPP works with the capability of every EOS camera's Raw files, drawing the best from them, while retaining their true representation of the natural world is easy with DPP.

When working with hi-res images, DPP simplifies the process of converting Raw in to fabulous finished shots. The main tools to refine your images are sharpening, contrast, and saturation. These are delivered by choosing an appropriate Picture Style and, where needed, adjusting of highlight and shadow detail to improve the perceived sharpness.

Colour is largely influenced by the choice of white balance, and while auto white balance is great in many circumstances, refinement can make all the difference for natural history shots.

With sharp lenses and highly detailed subjects, sharpening is key, especially for printed images, but also an important consideration for online images. While all cameras benefit from the sharpening tools, the latest models add a clarity control that is ideal for enhancing detail by improving that mid-tone contrast.

STEP BY STEP MAGNIFICENT MACRO IMAGES

Upgrade your macro shots without making them look fake and over-the-top

SPEED UP YOUR WORKFLOW

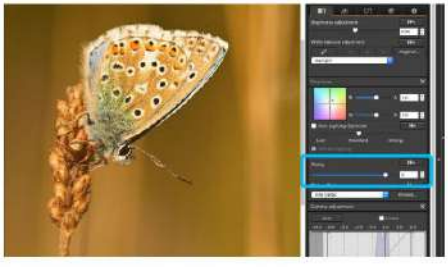
You can reduce the amount of adjustments in DPP with a good choice of settings in the camera. For Picture Style, you want to pick Fine Detail – a little extra sharpening for natural history macro shots is a good idea. If your camera has a clarity setting increase this too for improved micro contrast that helps enhance details.

01 SELECT THE RIGHT PICTURE STYLE

Picture Styles determine how colour, contrast and sharpness are applied to a Raw image. DPP uses the camera setting set value, and many photographers use auto. Fine Detail was newly developed for the 50Mp EOS 5DS and, in my view, has better colours than the Standard style. Once selected you might want to adjust shadow and highlight settings.

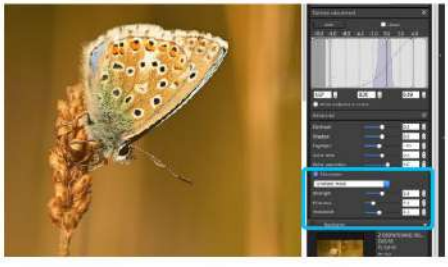
02 WHITE BALANCE ADJUSTMENT

Camera white balance (WB) is good, but sometimes you may want to refine the colour in your shots. You can use a WB preset, Kelvin value, or a click white balance adjustment. Here the WB was changed from auto to daylight and fine-tuned with amber and green tones to bring the image more closely in-line with how I remember it during the shoot.



03 CLARITY

The latest cameras have another image setting for clarity that enhances mid-tone contrast across your image. If the Raw is not from a camera with clarity setting you won't be able to use the DPP control. For this shot the clarity was increased to make the details of the butterfly more defined. For other cameras try adding small amounts of extra contrast.



04 SHARPENING

Zoom in to the image to 100% by pressing the x1 button on the lower left corner of the window, then increase the sharpening strength. Fineness affects how thick the sharpening appears and with fine detail you won't need much. Lastly, adjust the threshold to limit sharpening to only be applied to subject details not the smooth areas elsewhere in the frame.

CANONSCHOOL

EOS S.O.S

Our technical guru is here to help. No Canon conundrum is too big or small. Get in touch today at **EOSSOS@futurenet.com**

PhotoPlus EXPERT

BRIAN WORLEY

CANON PRO

Brian is a freelance photographer and photo tutor, based in Oxfordshire. He has unrivalled EOS DSLR knowledge, after working for Canon for over 15 years, and is on hand to answer all your EOS and photographic queries

How do I use focus peaking and the focus guide on my EOS R5 camera?

Gavin Spencer, Swansea

BRIAN SAYS... Focus peaking and the focus guide are both used to achieve accurate focus when manual focus is used. You need to select manual focus on the lens, or in the camera menu if you lens doesn't have an AF switch.

Focus peaking and the focus guide must be enabled from the AF2 menu on your camera. Focus peaking adds a coloured overlay over the parts of your shot that are in focus. You can choose red, green, or blue overlays.

As you adjust the focus the highlight changes to show what is in focus. The focus guide is an AF target that you can place in the frame. It uses three triangles to show whether your focus is in front of or behind the subject, and changes to two green triangles when focused.

Focus peaking and the focus guide ensure you get accurate manual focus, and are especially helpful for close-up macro photo subjects

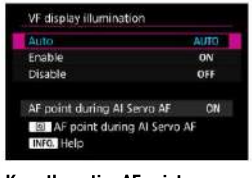
In low light it helps to have the AF points illuminated, so you can identify where the camera is going to focus before you take the shot

Is it possible for the active AF points to always be visible in the viewfinder of my Canon EOS 7D Mark II?

Stephen Freeman, Goring

BRIAN SAYS... With the camera default settings, the AF points or group of points are displayed in the viewfinder as black squares. For one-shot AF, points that are in focus change to a larger square once focus has completed and locked. If you use Servo AF, then AF points continuously update as the camera or subject moves.

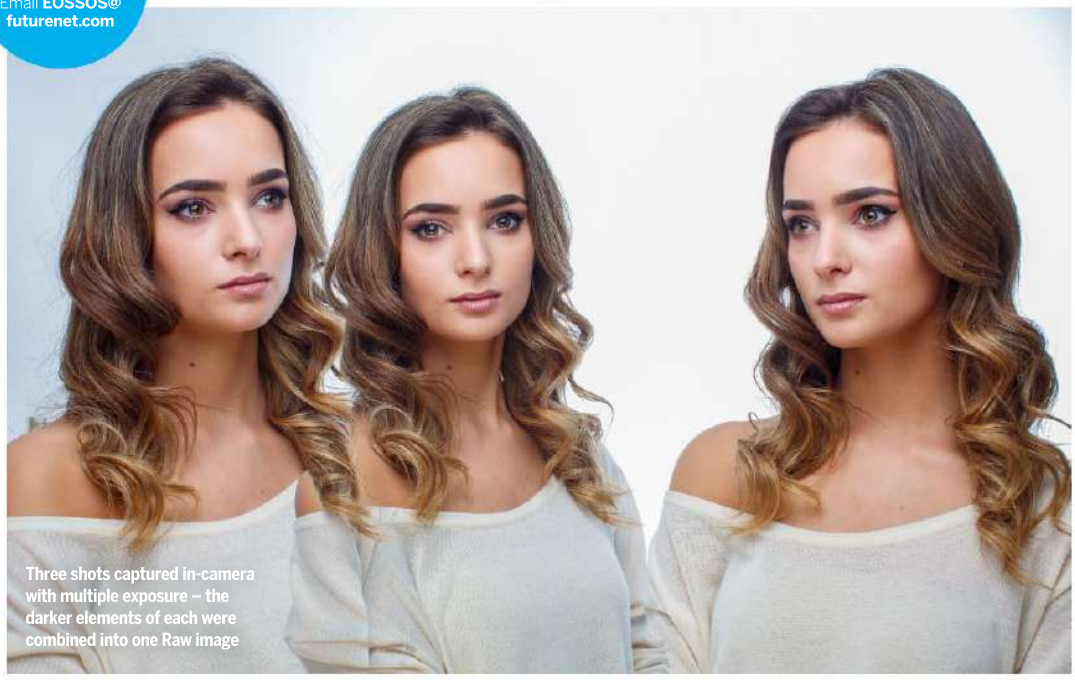
The camera can illuminate the AF points with a slowly flashing red light. In low-light conditions the red light briefly illuminates the AF points to make them clearer to see once focus is locked with one shot AF. For Servo AF, the AF points won't illuminate, but you can turn this on. Press the Q button when in the VF illumination menu to enable the illumination with Servo AF. The result is a slow flash of the red illumination that makes it easier to see the AF points. When shooting at night you might find the red flashing illumination can affect your night vision, so there is also an option to switch it off.



Keep the active AF points on display, and make sure to switch on the illumination even for AI Servo AF

Ask Brian! Confused with your Canon DSLR? Email **EOSSOS@futurenet.com**

SEEING MULTIPLE



Three shots captured in-camera with multiple exposure – the darker elements of each were combined into one Raw image

Magical multiples

Create impossible results in-camera by combining several shots into a single image

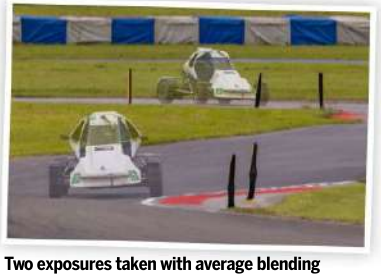
In-camera multiple exposure combines two or more separate shots to make a combined image. Multiple exposures hark back to the days of shooting several frames on a single piece of film. It's one of the rare situations where you can create a single Raw image that would not be possible any other way. If your camera doesn't have the multiple exposure function, you can use DPP or Photoshop to combine your individual frames.

Some cameras have a basic multiple exposure capability with average and additive blending, but more advanced models also have dark and brightness blending modes. Some devices allow up to nine frames to be combined, and you can use an image from the memory card as a base image. More advanced cameras have two different modes of multiple exposure shooting; On:Func/Ctrl, which allows you to check the results for each frame while shooting; and On:ContShtng, which is better for moving subjects. For these cameras you can choose to save the individual shots, as well as the combined one when On:Func/Ctrl is selected.

Additive blending adds the pixels from each frame, it's good for adding images against a black background, but often you need to use exposure compensation to avoid overexposed shots. For combinations of two images, use -1EV and for 4 shots use -2EV.

Set the camera to average blending and it will take care of the exposure compensation for you, so that the final frame is correctly exposed. If you have a shot of a park bench, and someone sits at each end for two exposures they will appear a ghostly, as they were present for only half the exposure in each component frame. Dark and bright blending modes use the darker or brighter part of each frame to determine where the blending occurs.

When using Live View mode or a mirrorless camera, your display will show the combined frame as you shoot, this helps when you're trying to combine multiple elements into one photograph. It's even possible to delete the most recent captured frame if you get the positioning wrong while using Live View.



Two exposures taken with average blending results in the changed subject being semi-transparent, giving it a ghostly appearance

Ratio control on Speedlites change the light as illustrated on the model above: 8:1 (left), 1:1 (centre), 1:8 (right)

What is the ratio setting on the Canon Speedlite 430EX III-RT used for?

Adam Joinson, Hemel Hempstead

BRIAN SAYS... Speedlites like the 430EX III-RT that can control other units with radio or optical wireless make it simple to control the balance between two or three groups of flashes. Sender units on the camera control group A and group B remote units independently. It's common to use group A to light the subject from one direction, and group B from another. If the Speedlite on the camera also illuminates, it is included in group A. The ratio control determines which group is the main light and which is the fill light. The scale runs from 8:1, 4:1, 2:1 and the same in reverse. 8:1 means group A would be 3-stops brighter than group B, and 1:4 means group A would be 2-stops less than group B. With E-TTL autoflash this is used for creative lighting.

Why does the AF point not move far from the centre of frame when I use the RF 600mm F11 lens on my EOS R5?

Will Fisher, Jersey

BRIAN SAYS... EOS R models have some restrictions on the parts of the frame that can reliably focus when using lenses with slower max apertures. With a small aperture, the light reaching the sensor is at the edges and comes at a steep angle, this makes it difficult for accurate AF. As you've discovered, the f/11 aperture of the RF 600mm lens means that only a small central area of the image is possible to use. The restriction applies regardless of the AF and it doesn't matter whether you use a single point, zone, expanded or face detection and tracking AF methods. White frames indicate the part of the frame where AF is possible.

White frames indicate the part of the frame where autofocus works with the Canon RF 600mm F11 IS STM lens

QUICK FIXES

Are there any advantages apart from reach of the EF-S 18-135mm USM or STM lenses over the EF-S 18-55mm basic kit lens?

Mike Gosling, Kettering

BRIAN SAYS... A more expensive lens like the EF-S 18-135mm offers better quality, even with the extra reach. For quick changes of focus go for the USM model.

Why does the background behind subjects go dark in the evening outside when using Aperture Priority?

Darren Gibson, Thetford

BRIAN SAYS... EOS cameras since 2018, changed how they operate with flash in Aperture Priority. For older cameras the shutter speed could vary from 30 secs to the sync speed, but this has now changed to 1/60 sec to the sync speed. You need to change the slow synchro setting in the camera for more balanced flash and low light exposures.

Is it possible to connect a USB HD to a camera?

Ethan Bennet, Fylde

BRIAN SAYS... EOS cameras can't write to a HD connected to the camera USB port.

Canon's RF Extender's front element stops it fitting inside the EF-EOS R mount adapter

Can you use the Canon RF Extenders with the EF to RF mount converter and EF lenses?

Emily Wharhurst, North Wales

BRIAN SAYS... In theory, the EF mount adapter converts EF lenses to RF mount, so it makes some sense and it would mean that one extender could work with EF and RF lenses. But the standard control ring and filter mount adapters are not circular inside. This means, that the larger diameter of the front element on the RF Extender can't fit inside the EF-EOS R mount adapter.

The lock switch or button on many cameras can be configured to lock multiple controls

I think my nose changes the AF point on my EOS camera when I use the EVF, can the touchscreen be temporarily deactivated?

Frank Whittle, Pembrokeshire

BRIAN SAYS... All cameras with touchscreens have a setting to deactivate them, but this takes away their benefit. An alternative is to temporarily deactivate them with the lock switch. Most advanced EOS cameras have the option to configure what controls are locked with the lock switch or button, and this includes the option to lock the touchscreen.

What is the difference between the time-lapse and interval timer functions? My Canon camera has both...

Sarah Baker, Newhaven

BRIAN SAYS... Interval timer and time-lapse are used to capture a series of stills over a period of time, it's a great way to show the progression of a slowly changing subject over a short time.

Time-lapse shooting is a function available when shooting movies. You preset the number of pictures to be captured and the interval. Most cameras show you how long the sequence will take to capture and the duration of the finished clip. You can capture up to 3600 frames at intervals from 2 seconds to 99 hours, 59 minutes and 59 seconds. Depending on the camera you might be able to go FHD with 1920x1080 resolution, 4K with 3840x 2160 pixels, or even 8K on the EOS R5. The camera captures the still images and saves the resulting clip as a movie file.

The interval timer function is available when shooting stills, the interval is the same as time-lapse, but a max of 99 shots can be captured. Once the sequence starts, the camera will save images as Raws or JPEGs, based on your camera settings and with the resolution you choose. The camera doesn't compile the shots for you to make a time-lapse movie, you need to use software on a computer to create the time-lapse clip.

Which to choose will depend on the subject, and what else you might do with the time-lapse. You will get high resolution using the interval timer, and the Raw images can be adjusted for max flexibility. Full resolution makes it possible to pan or zoom around the image when editing the movie. Using the time-lapse mode is simpler, as the resulting movie is ready to work with straight from the camera, and will capture more frames.

Interval timer captures individual still frames in Raw or JPEG, but is limited on the number of shots

When shooting time-lapse in movie mode the time to capture the sequence is displayed on the LCD screen

RATE MY PHOTO

Get critiqued! Email photos to **EOSSOS@futurenet.com** with the subject 'Rate My Photo'

Common Seal

MATTHEW BUTCHER, YORK SAYS... I took this photo of a common seal on a day trip to Ravenscar, North Yorkshire. It took some time to get close enough, even with a zoom lens, to get the shot. My patience and quietness were repaid when the seal obliged with this pose. Having got the shot, I gently backtracked away so as not to disturb the seal any further. The shot was taken using Aperture Priority, and with manual focus. I used Photoshop Elements 2020 to process the image, adjusting the contrast brightness and saturation levels, then cropping the shot to focus on the seal.

BRIAN SAYS... There's a lot to like about this photo. You did well to get close enough, and I like the expression on the seal's face that appears to be asking, "You got the shot yet?" You've got decent detail in the seal's fur, but the image is slightly soft, I think due to a bit of camera shake, and your manual focusing isn't spot on. The exposure is okay, but is a little bright on the left of the seal's face. Clearly the seal was your focus for this picture, but as you said you cropped in, I wonder if your original shot had more space on the left of the frame to put the seal in its environment. A wider view might help connect the seaweed and dark rocks at the top of the shot with the lower part as well.

GEAR UPDATE

Our round-up of the latest digital photography must-haves

01 Canon RF 100-400mm F5.6-8 IS USM

An affordable tele zoom for EOS R cameras

£699/$649

www.canon.co.uk

YOU'RE looking at a new compact, versatile and competitively priced RF telephoto zoom lens for Canon EOS R-series shooters wanting to capture sports and wildlife without breaking the bank – or their back. At 79.5x164.7mm in size and weighing only 635g, the new RF 100-400mm is more portable than Canon's existing Canon RF 100-500mm F4.5-7.1L IS USM, and four times cheaper! Yet it still offers up 5.5 stops of optical image stabilization and a Nano USM focus motor for smooth, fast focus.

02 Canon RF 16mm F2.8 STM

Light on the pocket, and fits in it too!

£319/$299

www.canon.co.uk

MEET CANON'S first ultra-wide RF-mount prime lens; a super-small, super-fast, super-light and super-affordable lens for full-frame mirrorless cameras. The RF 16mm f/2.8 STM aims to meet the growing demand for vlogging, as well as being a perfect lightweight lens for landscape, architectural and astrophotography. Employing Canon's STM focusing motor, the lens affords smooth, near-silent focusing during video recording, while minimum focusing distance is only 0.13m.

03 Vanguard VEO Adaptor backpacks

A backpack with USB connectivity!

From £99/$TBA

www.vanguardworld.co.uk

VANGUARD'S new VEO Adaptor backpacks include a USB interface port that enables you to place the power bank of your choice inside the bag's top compartment and connect it to the USB-A port inside the bag with a suitable cable. You then attach your device to the external USB-A port using another suitable cable, and can keep the power flowing with the power bank safely tucked inside your bag. Two versions of the bag are available: S models and R models. The S models come with extra-wide side access and have a daypack section.

04 Canon imagePROGRAF GP-4000

Print big. Really big!

£TBA/$TBA

www.canon.co.uk

IF YOU want to print really big, you need a large-format printer, and they don't get much larger than the new imagePROGRAF GP-4000. Not only can it print on paper up to 44 inches wide, its whopping 11-ink capacity includes red, orange, green, purple, and even fluorescent pink ink. These enable bright, bold, eye-catching color graphics to be produced for prints, posters and other professional output.

05 Profoto B10X and B10X Plus

New portable studio lights

From £1695/$1995

https://profoto.com

REPLACING the B10 and B10 Plus, the new B10X and B10X Plus feature strobe and continuous light functionality for lighting stills or video. While the B10X retains the 250Ws flash output of the B10, the continuous light power is up from 2500 lumens to 3250 lumens. The B10X Plus shares this continuous output, but offers double the flash power at 500Ws. The B10X and B10X Plus are ready to go in 1.2 seconds and 1.5 seconds respectively after a full-power flash, and can recycle as quickly as 0.05 seconds. The B10X and B10X Plus retain the size and weight of their predecessors: 1.5kg for the B10X, and 1.9kg for the B10X Plus. Battery life is also impressive: the B10X can fire 400 full power flashes while the higher-output B10X Plus version can manage 200.

06 Ilford Pop-up Darkroom

Develop analogue photos almost anywhere

£215/$265

www.ilfordphoto.com

ILLFORD'S Pop-up Darkroom is a tent big enough for you to stand in, and fit a table to put your enlarger and printing trays on. The external metal frame is about 2.2m tall when erected and should fit in most standard ceiling height rooms, while still creating a workable 1.3x1.3m floor area to work in while standing or seated. A durable and lightweight black material clips to the frame, while an accompanying ground mat offers protection for your flooring and can be fastened to the darkroom material.

CANON EOS R3

Canon's new professional sporting hero mirrorless R3 camera is eye-poppingly good with new clever AF, faster fps, and more

After being rolled out to select Canon pros at the Tokyo Olympics this year, the new Canon EOS R3 speed demon is now available to professionals at large – and Canon's latest mirrorless camera threatens to be the most capable all-round tool for working pros today.

While it's not technically a replacement for, or even an equivalent to, the Canon EOS-1D X Mark III (as this is 'only' a 3-series camera rather than a flagship 1-series), it technologically leapfrogs the 1D X Mark III in virtually every department. It also stakes a bold claim as the best professional camera thanks to its 6K Raw video, blistering and blackout-free EVF, 30fps shooting, and its peerless AF system that now enables you to move focus points by simply moving your eyeball.

There's no doubt that this is Canon's fastest and most advanced camera ever, even outdoing the mighty Canon EOS R5 when it comes to technology. But has Canon dropped a clunker, or been incredibly clever, by opting for a 24.1Mp sensor and 6K instead of 8K? Does the Canon EOS R3's 24.1Mp sensor provide sufficient pixel density for pro-level shooting in 2021? Let's find out.

The new EOS R3 will shoot at a super-fast 30fps, and has next-level AF tracking and new AF features to make it easier than ever to capture the action in camera

We took this portrait with a pre-production Canon EOS R3 camera with RF 85mm F1.2L lens at 1/250 sec, f/1.2, ISO100

"It fires 30fps bursts without any blackout, meaning that you get a continuous view of your subject in the scene"

Key features

The Canon EOS R3's headline features are jaw-droppers. Its stacked, back-illuminated 24.1Mp sensor boasts super-fast readout speeds that can capture photos at up to 30fps when shooting with the electronic shutter (buffering 540 JPEGs or 150 Raws), or 12fps with the mechanical shutter (for over 1000 JPEGs or 1000 Raws). And the speed of the sensor also virtually eliminates rolling shutter issues.

In fact, the whole camera is so fast that you can actually slow down the shutter mechanism itself. The R3's shutter lag is just 20ms, which is so quick that your muscle memory from using other camera might mean that you depress the shutter too soon – so you can adjust the shutter lag up to 45ms to compensate for this.

Speaking of shutter speed, you can shoot all the way down to 1/64,000 sec to literally freeze moments in time, and you can use flash with the electronic shutter – something that was unheard of not long ago.

The 24.1Mp resolution means that the sensor can capture 6K Raw video up to 60p, which also enables you to record oversampled 4K up to 60p. In addition, 10-bit 4K can be captured at up to 120p (with even cleaner results than the 4K 120p in the EOS R5) and it features the Canon Log 3 profile.

The back-illuminated sensor construction works in tandem with the impressive sensitivity of ISO100-102,400 (expandable to 50-204,800) for formidable low light performance, with the AF

Canon / Vladimir Rys

capable of focusing down to -7.5EV. In terms of focus, the EOS R3's signature feature is Eye Control AF – a phenomenal function that enables the camera to detect where your eye is looking, so you can place a focus point by simply looking at your subject. On top of that is the same core Dual Pixel CMOS AF II system that powers the R5 and R6, but featuring a brand new Deep Learning AF algorithm – which means AF performance is even more robust, and also adds a new subject detection with Human Eye AF and Animal Eye AF: called Vehicles AF.

Again like the R5 and R6, the EOS R3 also features a powerful in-body image stabilization (IBIS) system that offers up to 8-stops of compensation with select Canon RF lenses (including pro and trinity lenses like the Canon RF 70-200mm F2.8L).

Build & handling

The R3 is a cross between the chassis and general configuration of the EOS 1D X Mark III and the 'grammar' of the EOS R5. That means things like the mode dial and black LED top screen of the R5 with the shape, size and layout of the 1D X Mark III. And it feels familiar to users of both. The R3 is a professional DSLR-style body with integrated vertical grip (using the same high-capacity battery), featuring mirrored controls in the same position when used in portrait or landscape orientation. In keeping with the EOS R family, the R3 has a fully articulating touchscreen – despite this, it still retains the same level of weather sealing as the flagship 1D X Mk III.

The only caveat here is the new 21-pin Multi-Function Shoe, which provides both power and communication to mounted devices. This means that new accessories, such as the Canon Stereo Microphone DM-E1D, can be used without the need for an internal battery or additional cables – and they can be controlled directly from the camera's menu.

The electronic viewfinder doesn't turn off when you are shooting (aka black-out free) and refreshes at 120fps making it great for when you're shooting very fast subjects

Unique for a pro EOS body, the R3 has an articulating touchscreen, but still maintains weather sealing

However, using current generation accessories, such as the Canon Speedlite EL-1 with the hotshoe, will compromise the R3's weatherproofing. To retain weather sealing while using current accessories, you'll need the new Hot-shoe Adapter AD-E1.

The R3 feels as solid and substantial as the 1D X III, though of course the articulating screen means that it won't be quite as robust. It's noticeably lighter, yet somehow it doesn't feel bulky or heavy when switching between the R3 and the R5 – and that vertical grip means that the bigger RF lenses, like the meaty Canon RF 85mm F1.2L, are actually very well balanced.

The R3 takes the memory card setup from the R5, rather than the flagship DSLR, featuring one SD card slot and one CFexpress Type B slot. Like the R5, in one sense this is helpful, as it means that you don't need to invest in an expensive new card format – and you'll never be stuck for a spare card.

However, certain shooting modes (such as 4K 120p) aren't

available with an SD card, and buffering images at 30fps doesn't always play nice. And as a professional grade camera built around supreme performance, a dual CFexpress setup would have made more sense.

One of the best handling features is the inclusion of the optical Smart Controller from the top-end 1D X Mark III. Where the standard joystick moves AF points one position at a time, the Smart Controller enables you to whizz it around the screen as fast as you can move your thumb to put the AF box wherever you need.

To power the Eye Control AF, the electronic viewfinder is much chunkier than on other EOS R cameras. Using technology pioneered by Canon's medical division to map and scan the human eye, the EVF features eight low-powered infrared LEDs that scan the front of the eye and then project that information to place a point on the sensor. And it actually works! (More on that below.)

The R3 is the first Canon to get new Vehicle AF to track anything from F1 to GT, motorbikes to rally cars, and prioritizes the vehicle or the driver's helmet

The R3 gets the Smart Controller AF-ON button, which works like a mini touch-pad, enabling you to move the AF box around the screen with greater speed and accuracy

Crucially, for a camera designed for sports and news photography, the R3 boasts a super-fast start-up time. Canon clocks the boot-up at just 0.4 seconds – and while our thumbs weren't fast enough to see how true that figure is, flick the switch and the camera turns on pretty instantaneously. Much like the 30fps shooting, the R3 really is all about speed!

Performance

There's just one thing that can be said about the Canon EOS R3: it delivers. Moving over from the EOS-1D X Mark III, the increased resolution is immediately noticeable when shooting detail-rich photography, such as portraiture, while retaining the speed and manageable file sizes required for professional shooting.

The 30fps continuous shooting is phenomenal, and powered by the rock-solid Dual Pixel AF II it doesn't really matter whether you're tracking a human subject, like a basketball player performing smooth movement, or an erratically moving subject, like a dog fetching a ball, you will get an almost flawless hit rate.

Crucially it fires out these 30 frames without any blackout whatsoever, meaning that you get a clean, continuous view of your subject in the scene – along with the AF selection indicators, so you can be doubly sure that the right part of your image is in focus.

With a CFexpress card you can blast out frames for well over 15 seconds before the buffer fills, but the R3 could only manage 24fps when using an SD card – though that's to be expected, given the transfer speeds of the aging format. The other thing to bear in mind is battery life; when our battery dropped to 50% the burst rate fell to 20fps, so make sure you have spares if you're planning to continuously shoot action.

Eye opener!

In terms of the Eye Control AF, all we can say is 'Wow!' We were sceptical, having seen Canon trot out similar tech before; Eye Control AF actually featured, albeit using different technology, with the Canon EOS-3 SLR. There it was inconsistent, if it worked at all – and was especially problematic if you wore glasses.

We were very impressed by the R3's Eye Control AF technology – and it's all about the calibration. Like an eye test at the optician, you look into the viewfinder and the camera scans your eye as you look at dots at the top, bottom, left and right of the screen. Canon recommends you perform

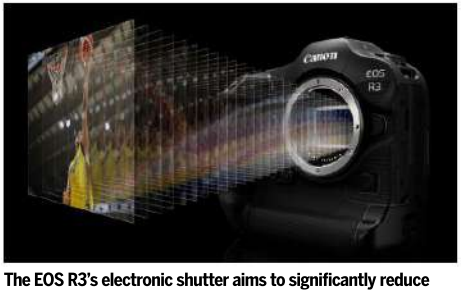
"We were very impressed by the R3's Eye Control AF technology – and it's all about the calibration"

Canon / Vladimir Rys

this procedure at least four times, and then again whenever you shoot in a new lighting situation.

This tech is not designed to be used with fast-moving subjects, like birds. Instead, it acts as something of a shortcut for the AF system. Say, for example, you're a working photojournalist shooting a celebrity in a group walking the red carpet. The eye detect AF might jump to any given celeb, meaning you'll need to manually select the AF point using either the joystick or Smart Controller. Instead, however, Eye Control AF enables you to simply look at the celeb you're after, and it will place the focus point right there – for you to half-press your shutter button and the AF system to snap on for pristine eye detection. Mileage may vary, but in our experience this is set to be an absolute game changer.

The EOS R3's new AF is equipped to track the helmets of motorbikes while you shoot at in blisteringly-fast bursts at 30fps



The EOS R3's electronic shutter aims to significantly reduce distortion of some moving subjects due to roller shutter effect

We need a little more time to put the video through its paces, but so far the 6K and 4K footage is crystal clear and once again benefits from all the clever AF detection seen in the stills side. And best of all, overheating is no longer the issue it was with the R5 and R6!

Thanks to the larger body and magnesium-alloy construction of the R3, heat is dissipated much more effectively. Canon claims that you can shoot up to 6 hours of 'regular video' and up to 1.5 hours of 120p footage. All we can say so far is that we shot 4K 60p for over 1 hour 15 minutes before the battery died, and didn't experience any overheating issues.

SPECIFICATIONS

SENSOR	24.1Mp stacked CMOS
IMAGE PROCESSOR	Digic X
AF POINTS	4779 stills / 3969 movies
ISO RANGE	100-102,400 (expandable to 50-204,800)
STABILIZATION	In-body (up to 8 stops with compatible lenses)
WEATHER SEALING	Yes
MAX IMAGE SIZE	6000x4000 pixels
VIDEO	6K up to 60p, 4K up to 120p, 1080p up to 60p
VIEWFINDER	Electronic 0.5-inch, 5.76m dots, 120Hz, 100% coverage, 0.76x magnification
MEMORY CARD	1x SD/SDHC/SDXC, 1x CFexpress Type
LCD	3.2-inch vari-angle touchscreen, 4.15 million dots
MAX BURST	30fps electronic (540 JPEG / 150 RAW), 12fps mechanical (1000+ JPEG / 1000 RAW)
CONNECTIVITY	USB-C 3.2, HDMI mini, headphone jack, microphone / line in jack, N3 terminal, 5GHz & 2.4GHz WiFi, Bluetooth 5.0, Ethernet, GPS / GNSS
WEIGHT	822g body only (1015g with battery and memory card)
DIMENSIONS	150x142.6x87.2mm
PRICE	Pre-order £5879 / $5999

THE VERDICT

Canon EOS R3 sports hero

Whether you shoot sports, weddings, portraiture, wildlife or news, the EOS R3's blackout-free EVF, 30fps stills, and 6K Raw video mean that you never miss a moment of action or detail. While the improved AF performance, coupled with ghostly-good Eye Control AF, ensure that every shot is focused exactly where you want it. The choice of split CFexpress / SD cards for memory is the only real foible, as the slower speed of SD inhibits things like 4K 120p and clashes the 30fps shooting down to 24fps – and doesn't play well with buffering.

As for the 24.1Mp resolution sensor, it feels pitch-perfect for the sports and news photographers this camera is squarely aimed at. 50Mp is great, but if you've ever had to upload hundreds of hi-res files to an FTP, or update your memory cards and computer HDs, then you know how impractical that size is.

The 30fps is true, the Eye Control AF just plain works, the Deep Learning algorithm is great at detecting subjects, and the ability to shoot 4K 60p video without overheating means this succeeds where even the R5 fell short. The Canon EOS R3 is the professional camera of the future – and it's here now. We still need to perform our full lab tests, but after extensively shooting with the Canon EOS R3 we can confidently say that it should be the tool of choice for working pros – whatever you're photographing.

PROS: 30fps stills, 6K RAW video Eye Control AF works! Blackout-free shooting, weather sealed body
CONS: 'Only' 24.1Mp, no 8K video, Split SD / CFexpress cards

PhotoPlus VERDICT

FEATURES	★★★★★
BUILD & HANDLING	★★★★★
IMAGE QUALITY	★★★★★
VALUE	★★★★½
OVERALL	★★★★★

THE CONTENDERS

Canon RF 85mm F2 Macro IS STM
£649/$599

Canon EF 100mm f/2.8L Macro IS USM
£999/$1299

Canon RF 100mm F2.8L Macro IS USM
£1479/$1399

Laowa 100mm f/2.8 2:1 Ultra Macro APO
£469/$399

Sigma 70mm f/2.8 DG Macro Art
£449/$569

Sigma 105mm f/2.8 EX DG OS HSM Macro
£359/$619

Tamron SP 90mm f/2.8 Di VC USD Macro
£649/$649

Tokina atx-i 100mm f/2.8 FF Macro
£399/$429

LARGER THAN LIFE

Fit a macro lens to your Canon camera and you'll see the world in almost microscopic detail. Here are the best options…

Most macro prime lenses have a max magnification ratio of 1.0x or 1:1. At their shortest focus distance, they can reproduce objects at full life-size on the camera's image sensor. An area measuring just 36x24mm would fill the image sensor of a full-frame camera, and it's a mere 22x15mm if you're shooting with an APS-C format body. A couple of the lenses in our test go further, boosting macro magnification to 1.4x or 2.0x.

That might not sound impressive, but the thing to bear in mind is how much larger the resulting image is when you view it on screen or in print. The scope for enlargement is amazing. Tiny garden bugs can become giant, alien creatures and you'll see levels of fine detail that are invisible to the naked eye. Get in close with a macro lens and ordinary objects turn into something extraordinary.

Shooting macro images demands a high level of precision. Depth of field (DoF) can be wafer-thin, even when using narrow apertures, as we'll come to later. Accurate focusing is, therefore, absolutely critical. Indeed, you can be better off using manual focusing instead of autofocus (AF), and selecting a magnified Live View image to accurately focus on the most critical part of the object you're shooting. Camera-shake is another ever-present danger, but most recent Canon macro lenses have high-tech hybrid image stabilizers to reduce the risk. Let's take a closer look at the best buys in the current macro lens market.

CANON RF 85mm F2 MACRO IS STM £649/$599

This fast and versatile short telephoto prime includes a 0.5x macro facility

Following in the footsteps of the Canon RF 35mm F1.8 MACRO IS STM, this 85mm lens delivers a useful 0.5x magnification at its closest focus distance, which is sufficient for creating enlargements of very small objects in fine detail. But the 85mm focal length enables a more comfortable working distance at the closest focus distance of 0.35m.

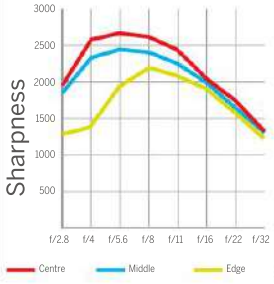
In general photography, the combo of the 85mm focal length and f/2 aperture rating enables a tight depth of field, making this lens eminently suitable for portraiture and still life photography.

Handheld photography in these scenarios benefits from a 5-stop hybrid image stabilizer (IS) and, coupled with the in-body stabilizers of the newest EOS R5 and R6 cameras, handheld macro shooting becomes a real possibility. The combination gives you a much better hit rate than using a hybrid stabilized lens on a DSLR or EOS M-series mirrorless.

Another macro-friendly feature is a 3-position AF range limiter switch, which can lock out both the long and short ends of the range, either side of 0.35m.

Performance

AF is quick and near silent. The image stabilizer lives up to its claims and handling is a dream. Sharpness across the whole image frame remains fabulous from very wide apertures down to f/22, and stays impressive even at the narrowest aperture of f/32. Colour fringing is negligible and there's only a hint of pincushion distortion.



FEATURES

01 The 'optional' ET-77 lens hood is pretty pricey at £58/$50.

02 A customizable control ring towards the front can be used for various functions.

03 The MF ring at the rear is electronically coupled, allowing excellent precision.

04 An AF range limiter switch can lock out the short or long end of the range.

05 The f/2 aperture rating makes the lens superb for macro and portrait work.

VERDICT

FEATURES ★★★★★

BUILD & HANDLING ★★★★½

PERFORMANCE ★★★★★

VALUE ★★★★½

OVERALL ★★★★★

HOW WE TEST

We combine real-world shooting results with rigorous lab testing to arrive at our overall ratings

To test real-world performance, we use lenses in all sorts of lighting conditions, for indoor and outdoor shooting scenarios. We check for good build quality and handling, smooth and precise operation of all controls, and we test the speed and accuracy of autofocus.

We typically test full-frame compatible EF lenses on a range of full-frame and APS-C format bodies, whereas EF-S lenses that are designed specifically for APS-C format bodies are only tested on cameras like the EOS 90D and 7D Mark II. EF-M and RF lenses are tested on respective EOS M and EOS R type mirrorless bodies. In-camera corrections for chromatic aberrations, distortion and peripheral illumination are disabled throughout testing, this helps reveal the true performance of each lens.

We also run a full range of lab tests under controlled conditions, using the Imatest Master and DxO Analyser suites. Photos of test charts are taken across the range of apertures and zoom settings, then analysed for sharpness, distortion and chromatic aberrations (colour fringing).

CANON EF 100mm f/2.8L MACRO IS USM £999/$1299

Canon's range-topping EF-mount macro lens ushered in a new era of hybrid stabilization

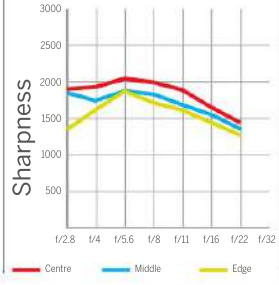
Although Canon's hybrid stabilizer has been inherited by a number of other EF-S and RF macro lenses, the full-frame compatible 100mm L-series macro was the first lens to feature it. With enhanced performance for close-up shooting, the stabilizer counteracts movements in the horizontal and vertical planes, as well as regular vibrations.

Even so, its claimed effectiveness of 4 stops in general shooting shrinks to 3 stops at 0.5x magnification and 2 stops at full 1.0x macro shooting. For extreme handheld close-ups, you're equally likely to run into problems with front-back movements, for which the stabilizer can't compensate.

Other headline attractions include typically robust L-series build quality and weather-seals. In general shooting, bokeh is pleasant at the widest aperture of f/2.8 and remains so when stopping down. The ring-type ultrasonic AF system is rapid and quiet, while manual focusing is smooth and precise. As with most L-series lenses, it comes complete with a hood. Optional accessories include a Macrolite Adapter for use with Canon's external Macro Twin or Ring Lites and a tripod mount ring.

Performance

Perfect for macro shooting, sharpness is superb at medium to narrow apertures, and it remains impressive even when shooting wide-open at f/2.8. Colour fringing is minimal, but there's a little barrel distortion. Still, it's uniform in nature and easy to correct.



FEATURES

01 This one has a 67mm filter thread.

02 It's supplied complete with a high-quality hood.

03 The pro-grade construction is very robust and includes weather-seals.

04 The autofocus limiter switch can lock out either the short or long end of the range.

05 When launched, this was the first Canon lens to feature a hybrid image stabilizer.

VERDICT

FEATURES ★★★★★

BUILD & HANDLING ★★★★★

PERFORMANCE ★★★★½

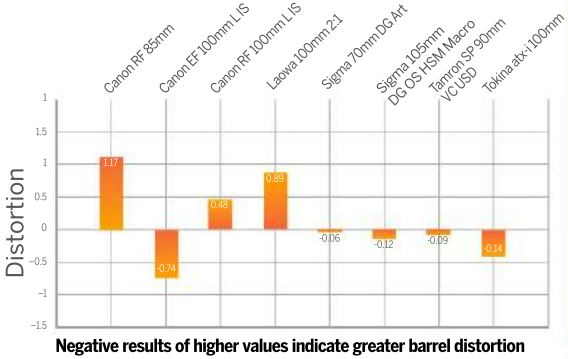
VALUE ★★★★☆

OVERALL ★★★★½

DISTORTION

Levels of distortion are generally very minimal at worst, and completely negligible at best

Macro lenses are generally designed to be high-precision technical optics. As such, they're usually 'flat field' lenses that have no field curvature, so if you shoot a flat object from front-on, the whole of the surface covered by the image frame should be rendered sharply. Similarly, distortion is usually very minimal or virtually non-existent, especially with macro lenses that have a focal length of 60mm or more. As our graph shows, however, there's a slight variance of barrel and pincushion distortion amongst the lenses on test.



Negative results of higher values indicate greater barrel distortion

CANON RF 100mm F2.8L MACRO IS USM £1479/$1399

Canon's new kid on the macro block is a superstar that bumps up the magnification

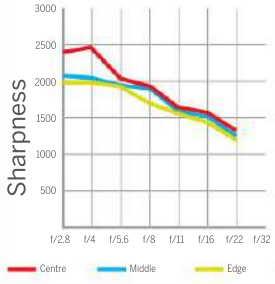
A world-first, Canon's new RF 100mm is a 1.4x macro lens with AF, and the AF is very fast as well, based on a Dual Nano USM system. As such, it's not only speedy for stills, but enables smooth and virtually silent autofocus transitions when shooting video.

The hybrid optical IS delivers 5-stop performance in general shooting, boosted to 8 stops by later EOS R-series cameras that feature in-body stabilization. As usual though, effectiveness drops off as you near the shortest focus distance. Even so, the combination makes handheld macro shooting viable, enabling you to snap quick shots that you'd probably miss if you had to set up a tripod.

Another innovative feature of the lens is its Spherical Aberration control ring, which enables you to adjust the quality of defocussed areas for enhanced bokeh. Given that defocussed areas are quite large in macro shooting, it's great being able to make them look their best. Handling is intuitive with fine manual focus adjustments available from the electronically coupled focus ring, and the lens has a solid weather-sealed construction, as you'd expect from an up-market L-series optic.

Performance

Levels of sharpness are scintillating, even at very wide apertures, enabling you to make the most of bokeh adjustments, and remain excellent throughout the aperture range. Colour fringing and pincushion distortion are both minimal.



FEATURES

01 There's a customizable control ring at the front.

02 The electronically coupled manual focus ring enables precise adjustments.

03 The Spherical Aberration control ring allows for bokeh enhancement.

04 The AF range limiter switch can lock out the short or long end.

05 Hybrid stabilization gets more effective when combined with in-camera stabilization.

VERDICT

FEATURES ★★★★★

BUILD & HANDLING ★★★★★

PERFORMANCE ★★★★★

VALUE ★★★★½

OVERALL ★★★★★

DEPTH OF FIELD

You'll be working with a tight DoF when shooting extreme close-ups

Depth of field can shrink to just a couple of millimetres when shooting up close at full macro magnification. Even at a slightly longer focus distance that gives 0.5x/1:2 magnification, these shots of a matchbox-sized model bus show how small DoF can be. The back of the bus is 4cm further away from the camera than the front.

LAOWA 100mm f/2.8 2:1 ULTRA MACRO APO £469/ $399

This Laowa lens goes extra-large on macro magnification and comes in both EF and RF flavours

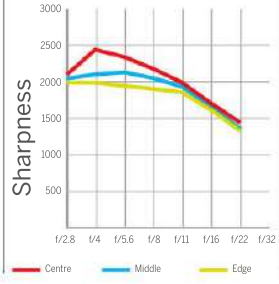
There are two similar editions of this full-frame compatible, manual-focus macro lens for Canon. One comes in EF mount for DSLRs, the other in RF mount for EOS R-series mirrorless cameras. The RF version is the more 'manual' of the two, but both give twice the max macro magnification of most macro primes, at 2.0x.

The RF mount edition is 30mm longer than the EF model, and also has a more well-rounded aperture, based on 13 diaphragm blades, rather than seven. However, unlike the EF edition, it has no built-in electronics, so you have to set the aperture manually via the on-board control ring. This would give a dark viewfinder image at narrow apertures on a DSLR, but that's no problem with live exposure preview in a mirrorless camera's electronic viewfinder.

We tested the mirrorless version and found that the working distance between the front of the lens and the object you're shooting is quite short at 9cm for 1.0x macro magnification, shrinking to 7cm for 2.0x magnification. Most 100mm 1.0x macro lenses have a more generous working distance of around 14-15cm, but that's the price you pay for the extra magnification.

Performance

The manual effort required pays dividends in terms of excellent image quality, thanks to superb sharpness and a minimum of colour fringing. There's a little pincushion distortion, but not enough to cause any concern.



FEATURES

01 The front element nears the forward end of the barrel at shorter focus distances.

02 A 2.0x macro magnification is the lens's biggest feature.

03 EF and RF versions are manual-focus, but the RF version lacks aperture control electronics.

04 The MF ring operates smoothly and has a long rotational travel.

05 The lens has focus distance and magnification scales.

VERDICT

FEATURES

BUILD & HANDLING

PERFORMANCE

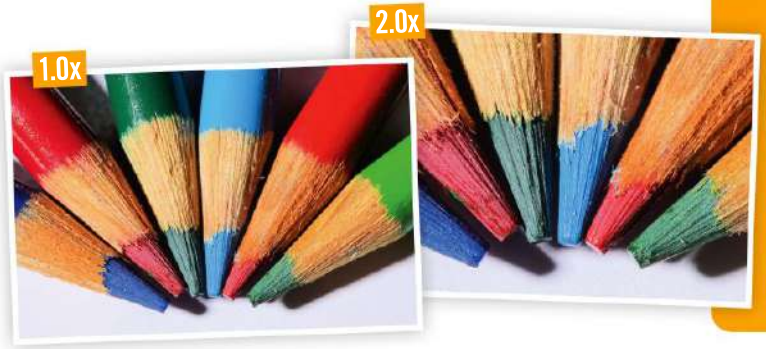
VALUE

OVERALL

THE X FACTOR

Not all macro lenses are created equal, when it comes to magnification factors

Most of the lenses on test deliver a 1.0x max magnification ratio, attainable at the closest available focus distance. The Canon RF 85mm only gives half the magnification, at 0.5x. Going above and beyond the call of macro duty, the Canon RF 100mm delivers 1.4x magnification, and the Laowa 100mm bumps things up to 2.0x.



SIGMA 70mm f/2.8 DG MACRO ART £449/$569

This 70mm macro lens is Sigma's first in the Global Vision line-up

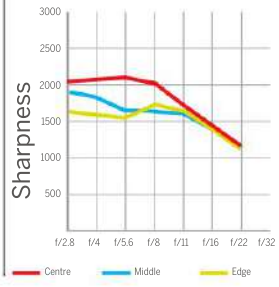
As we've become used to in Art lenses, build quality is excellent, combining a weather-sealed brass mounting plate with a TSC (Thermally Stable Composite) barrel and internal components. A coreless DC motor enables quick and whisper-quiet AF, with great precision. Manual override and equally precise fully manual focusing are available via the electronically coupled manual focus ring, as with Canon's STM stepping motor and Nano USM systems.

The optical design uses two top-grade FLD ('Fluorite' Low Dispersion) elements and two SLD (Special Low Dispersion) elements, along with one high refractive index element. Two aspherical elements are also incorporated, with the aim of enhancing resolution at very close focus settings.

The Sigma doesn't have internal focusing. Instead, the length of the lens increases as the focus distance becomes shorter. Sigma says that this helps to avoid any compromise in macro image quality, but a drawback is that the working distance from the front of the lens to the subject shrinks to just 6cm for full macro magnification.

Performance

Sharpness is stellar between f/2.8 and f/11, with little drop-off towards the edges of the frame. However, sharpness isn't retained as well as in the Canon 100mm L-series lens at narrower apertures, often preferred for macro shooting. Other aspects of image quality are highly impressive, with virtually no colour fringing and practically zero distortion.



FEATURES

01 The front element is deeply recessed, but a hood is supplied.

02 Macro working distance is reduced by the extending inner barrel.

03 The 'fly-by-wire' focus ring enables manual adjustments.

04 A three-pole AF limiter switch enables you to lock out the short or long range section.

05 The plated brass mounting plate features a rubber weather-seal ring.

VERDICT

FEATURES ★★★★☆

BUILD & HANDLING ★★★★½

PERFORMANCE ★★★★½

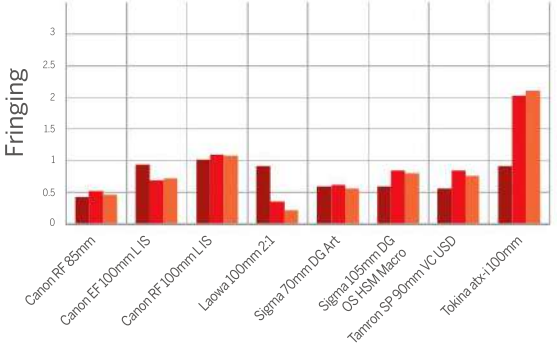
VALUE ★★★★☆

OVERALL ★★★★½

COLOUR FRINGING

There's minimal colour fringing here

As with distortion, levels of colour fringing are minute with the macro lenses in this test group. Lateral chromatic aberration is generally negligible, even towards the extreme edges and corners of the image frame. Naturally, this can be automatically corrected in-camera or when editing Raw files in Digital Photo Professional, when using recent and current Canon cameras with own-brand lenses, as well as with the Sigma 70mm Art lens.



Sigma 105mm f/2.8 EX DG OS HSM Macro £359/ $619

Sigma's older macro lens is competitively priced and adds the bonus of stabilization

Like many modern macro lenses, Sigma's full-frame compatible 105mm works equally well as a fast telephoto prime. The f/2.8 aperture enables quick shutter speeds even under dull lighting, while the fast ring-type ultrasonic AF system is good for tracking action. To speed up AF in tricky conditions, there's also a three-position range limiter, with which you can select just the short or long focus range, either side of 0.5m.

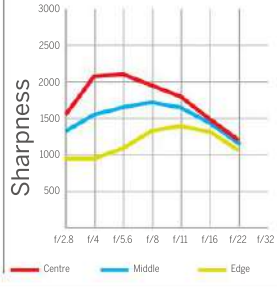
This lens also has fully internal focusing and adds the bonus of IS. It has a 4-stop effectiveness in general shooting and comes with switchable static and panning modes but, as it's a regular rather than hybrid stabilizer, it's relatively ineffective for close-up shooting. Build quality is good, but the lens does lack weather-seals.

Optical highlights include two SLD (Special Low Dispersion) elements to improve sharpness and contrast, while reducing colour fringing, and Sigma's proprietary Multi-Layer Coatings to minimize ghosting and flare.

Performance

Sharpness is excellent through most of the aperture range and across most of the frame, although corner-sharpness is comparatively lacklustre at very wide apertures.

The Sigma also loses out to the Canon 100mm L-series lens for sharpness at very narrow apertures. Image quality is on level terms with the Canon for control over colour fringing, and the Sigma produces less distortion.



FEATURES

01 A hood and an APS-C hood converter are supplied.

02 Ring-type ultrasonic AF is quick and quiet.

03 Switchable stabilization modes are available for static and panning shots.

04 The AF range limiter locks out short or long distances either side of 0.45m.

05 Build quality is very good overall, but the lens lacks any weather-seals.

VERDICT

FEATURES
★★★★½

BUILD & HANDLING
★★★★½

PERFORMANCE
★★★★½

VALUE
★★★★★

OVERALL
★★★★½

SHINE A LIGHT

Canon offers APS-C format lenses with built-in lighting

If you're looking for a dedicated APS-C macro lens, Canon options in the EF-M 28mm f/3.5 Macro IS STM (£287/$299) for mirrorless EOS M-series cameras, and the EF-S 35mm f/2.8 Macro IS STM (£389/$349) for DSLRs. Both have built-in LED macro lamps in the front of the lens barrel, useful for illuminating subjects at close range. It's a dual lamp arrangement, so you can select one side or the other, or use both, along with two selectable brightness levels. Both lenses also feature Canon's hybrid IS system, and near silent AF based on a stepping motor. They're neat lenses, but the built-in lamps only deliver sufficient illumination for slow exposures of around 1/8 to 1/15 sec at f/8, with a sensitivity setting of ISO200.

Canon's dinky APS-C format EF-M 28mm and EF-S 35mm lenses have dual LED lamps built into the front of the barrel, powered from the host camera's battery

TAMRON SP 90mm f/2.8 DI VC USD MACRO £649/ $649

Tamron's 90mm macro lenses are somewhat legendary, and the newest model is the best yet

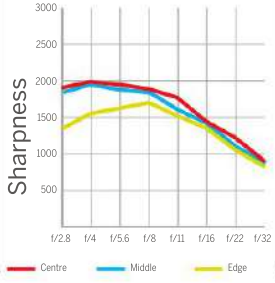
Tamron's popular line of 90mm macro lenses stretches all the way back to 1979. The latest 'F017' model is distinguished by a silver band around the base, and comes with a host of attractions. It has a revised optical layout, adding a second top-grade XLD (eXtra Low Dispersion) element.

Autofocus is courtesy of a ring-type ultrasonic system which is fast and ultra-quiet, while manual focusing is smooth and precise. However, you'll need a lens with a serial number of 009458 or higher for compatibility with EOS R and RP cameras via a mount adapter. Lenses with lower serial numbers will require a firmware update to V3.0 or higher, which can be applied via Tamron's TAP-in Console (USB docking station).

The lens features a proprietary hybrid IS or VC (Vibration Compensation) system. Like in Canon's stabilized macro lenses, this counteracts x-y shift as well as angular vibration, with 4-stop effectiveness in general shooting. The weather-sealed build quality is good and a fluorine coating is featured on the front element.

Performance

Sharpness proved less impressive than with the Canon 100mm L-series lenses for medium-range lab test charts, but the Tamron proved razor-sharp at very short focus distances for macro shooting. When using narrow apertures, colour fringing towards the corners of the frame becomes marginally worse than from some other lenses on test, but is still very well controlled.



FEATURES

01 A muck-resistant fluorine coating is applied to the front.

02 The lens comes with a hood and has a 62mm filter thread.

03 The AF limiter switch can lock out the close or far range, either side of 50cm.

04 There's ring-type ultrasonic autofocus and a focus distance scale beneath a viewing panel.

05 Weather-seals include a rubber ring around the mounting plate.

VERDICT

FEATURES ★★★★★

BUILD & HANDLING ★★★★★

PERFORMANCE ★★★★★

VALUE ★★★★½

OVERALL ★★★★★

FOCUS STACKING

Here's a way of extending your depth of field

With such a tight DoF in macro photography, it's impossible to get three-dimensional objects sharp all over, unless you employ some trickery. The technique of focus stacking enables you to shift the point of focus throughout a series of shots, which you then merge together to form a single composite image. You generally need to alter the focus manually, or use a macro focus rail like the Manfrotto pictured, but some Canon cameras, including the 90D, RP, R5 and R6 have an automatic focus bracketing feature built-in. What's more, later versions of Digital Photo Professional (V4.10 and above) have a Depth Compositing function, which can take care of the merging process.

For focus stacking, the Manfrotto 454 Micrometric Positioning Plate (£99/$119) enables you to precisely shift the camera, and therefore the point of focus, through a series of shots

TOKINA ATX-I 100mm f/2.8 FF MACRO £399/$429

Tokina brings its 15 year-old 100mm macro lens up to date with the new atx-i edition

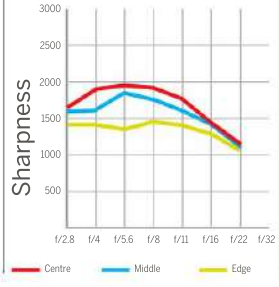
This lens has a lot in common with the original AT-X model, which was launched back in 2006. Indeed, the optical path appears to be identical, based on nine elements in eight groups and featuring two aspherical glass elements and two Super-Low Dispersion glass elements.

The build is compact, but the inner barrel extends as you reduce the focus distance from infinity towards the shortest focus setting. Even so, the working distance between the front of the lens and the subject is pretty respectable in full macro mode, at 11.5cm.

The AF motor isn't that fast and is clearly audible. § with most Tokina lenses, old and new, there's a 'One-touch Clutch' mechanism for the focusing ring. You snap the focus ring forwards to engage AF mode, or pull it back to swap to MF mode. There's also a focus range limiter switch which works in the long and short sections of the focus distance range, and it works in AF and MF modes. The long-throw focus ring enables fine, precise, manual adjustments. Construction feels typically robust for a Tokina lens, but lacks any weather-seals.

Performance

Levels of sharpness are impressive, remaining good at narrow apertures. Lateral chromatic aberration can be noticeable towards the edges and corners of the frame, and the Tokina can't take advantage of in-camera corrections. Overall, the 'new' lens has an old-fashioned feel to it, however image quality is exceptional.



FEATURES

01 The inner barrel extends at shorter focus distances.

02 The focus ring snaps back and forth for activating MF or AF.

03 For an autofocus lens, the focus ring has a long travel enabling precise adjustments.

04 The focus range limiter can lock out the short or long end of the range.

05 Build quality feels tough and sturdy, but the lens lacks any weather-seals.

VERDICT

FEATURES ★★★★☆

BUILD & HANDLING ★★★★☆

PERFORMANCE ★★★★☆

VALUE ★★★★½

OVERALL ★★★★☆

GET FLASH WITH CLOSE-UPS

Dedicated flashguns will add illumination and freeze motion

Close-up photography is prone to blurriness caused by even the slightest movement on the part of the camera or subject being shot. It's, therefore, essential to avoid slow shutter speeds, so plentiful light is good to have. A regular flashgun can work well, and should easily be powerful enough as the distances between camera and subject are only small. However, they tend to give a harsh and directional light that makes for deep, dark shadows. A more effective solution is to use a specialized 'ring flash' or macro light for close-up shooting, like the Canon MR-14EX II Macro Ring Lite. It incorporates dual, independently controllable flash tubes and mounts around the end of a lens, although an adaptor ring may be needed.

The MR-14EX II enables high-quality, shadow-free macro photography and features dual, independently controllable flash tubes

COMPARISON TABLE

	CANON RF 85mm F2 MACRO IS STM	CANON EF 100mm f/2.8L MACRO IS USM	CANON RF 100mm F2.8L MACRO IS USM	LAOWA 100mm f/2.8 2:1 ULTRA MACRO APO	SIGMA 70mm f/2.8 DG MACRO ART	SIGMA 105mm f/2.8 EX DG OS HSM MACRO	TAMRON SP 90mm f/2.8 DI VC USD MACRO	TOKINA ATX-I 100mm f/2.8 FF MACRO
	www.canon.co.uk	www.canon.co.uk	www.canon.co.uk	www.ukdigital.co.uk	www.sigma-imaging-uk.com	www.sigma-imaging-uk.com	www.tamron.eu	www.tokinalens.com
Full-frame compatible	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Effective focal length (APS-C)	N/A	160mm	160mm	160mm	112mm	168mm	144mm	168mm
Max magnification factor	0.5x	1.0x	1.4x	2.0x	1.0x	1.0x	1.0x	1.0x
Min focus distance	0.35m	0.3m	0.26m (1.4x)	0.25m (2x)	0.26m	0.31m	0.3m	0.3m
Narrowest aperture	f/29	f/32	f/32	f/22	f/22	f/22	f/32	f/32
Elements/Groups	21/11	15/12	17/13	12/10	13/9	16/11	14/11	9/8
Diaphragm blades	9 blades	9 blades	9 blades	7-13 (EF-RF)	9 blades	9 blades	9 blades	9 blades
Autofocus	Stepping motor	Ultrasonic (ring-type)	Dual Nano Ultrasonic	None	Stepping motor	Ultrasonic (ring-type)	Ultrasonic (ring-type)	Electric motor
Internal focusing	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Manual autofocus override	Electronic	Mechanical	Electronic	N/A	Electronic	Mechanical	Mechanical	Mechanical
Autofocus limit switch	Short/long/full	Short/long/full	Short/long/full	N/A	Short/long/full	Short/long/full	Short/long/full	Short/long/full
Image stabilizer	Yes (hybrid)	Yes (hybrid)	Yes (hybrid)	No	No	Yes	Yes (hybrid)	No
Filter size	67mm	67mm	67mm	67mm	49mm	62mm	62mm	55mm
Hood	ET-77, £58/$50	ET-73, included	ET-73C, included	Included	Included	Included	Included	Included
Dimensions (Dia x Length)	78x91mm	78x123mm	82x148mm	72x125-155mm (EF-RF)	71x106mm	78x126mm	79x117mm	73x98mm
Weight	500g	625g	730g	638-650g (EF-RF)	515g	725g	610g	525g
Target price	£649/$599	£999/$1299	£1479/$1399	£469/$399	£449/$569	£359/$619	£649/$649	£399/$429
FEATURES	★★★★★	★★★★★	★★★★★	★★★½	★★★★	★★★★½	★★★★★	★★★½
BUILD & HANDLING	★★★★½	★★★★★	★★★★★	★★★★	★★★★½	★★★★½	★★★★★	★★★★
PERFORMANCE	★★★★★	★★★★½	★★★★★	★★★★½	★★★★½	★★★★½	★★★★★	★★★★
VALUE	★★★★½	★★★★	★★★½	★★★★½	★★★★	★★★★★	★★★★½	★★★★½
OVERALL	★★★★★	★★★★½	★★★★★	★★★★	★★★★½	★★★★½	★★★★★	★★★★

THE WINNER IS... CANON RF 100mm F2.8L MACRO IS USM

Canon's RF 100mm macro lens for mirrorless sets a new benchmark

Canon delivers with its new RF 100mm macro. Build and handling are fabulous and the Spherical Aberration control ring and oversized 1.4x magnification, and spectacular image quality take it all to another level. But it only works on EOS R-series mirrorless cameras. Same goes for Canon's RF 85mm, which is superb if you can settle for a 0.5x max magnification.

For full-frame and APS-C DSLRs, the Canon EF 100mm L-series and Tamron's 90mm are top optics. The Canon is sharper in general shooting, but the Tamron draws level for close-ups and is less expensive.

If on a tighter budget, the Sigma 105mm is the choice. It has a regular stabilizer, but works well for general shooting, sports and wildlife photography. Tokina's 100mm atx-i 100mm is a more conventional macro lens, whereas Sigma's 70mm is a high-performance option if you fancy a shorter focal length.

SPORT

TECH

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PhotoPlus

BUYERS' GUIDE

With prices ranging from a couple of hundred to a few thousand, Canon has an EOS camera to suit everyone, from the complete beginner to most demanding pro…

What to look for

Canon EOS cameras

Canon splits its EOS DSLR lineup into entry-level, enthusiast and pro ranges; the 4000D is the most basic, the 850D and 77D for intermediates, the 80D and full-frame 6D Mk II for more advanced enthusiasts, while the 7D, full-frame 5D and 1D lines have pro-level features. With more expensive models, expect greater handling, more robust build quality (weather-sealing and magnesium-alloy shells), more advanced features, and full-frame rather than APS-C image sensors. Over the page, we also have the full-frame EOS R mirrorless cameras, the EOS RP as an 'entry-level' and more affordable option, the EOS R and R5 for serious photographers. Plus not forgetting Canon's smaller compact system (also mirrorless) APS-C EOS M camera range.

DSLR CAMERAS

PRICES QUOTED ARE BODY-ONLY UNLESS STATED

ENTRY-LEVEL

CANON EOS 4000D

TESTED IN ISSUE **140** PRICE: **£300/$N/A**

CANON has stripped everything down to its bare essentials for the 4000D, and it's a great if basic DSLR for beginners, and at only £300 (body), it's the cheapest new EOS DSLR. Sadly, it's let down by a cheap kit lens, that's tough to tolerate, so we suggest buying the better IS lens. ★★★☆☆

Sensor	18Mp APS-C CMOS
Viewfinder	Pentamirror, 0.8x, 95%
ISO	100-6400 (12,800 exp)
AF	9-point (1 cross-type)
LCD	2.7-in, 230k-dot
Max burst (buffer)	3fps
Memory card	SD/SDHC/SDXC

CANON EOS 2000D (REBEL T7)

TESTED IN ISSUE **149** PRICE with 18-55mm kit lens: **£329/$400**

THE 2000D is a better-spec Canon camera than the 4000D, but comes with a step up at its RRP current price. It's arguably worth the extra, but that puts it in a difficult spot, where another step up in outlay will get you an EOS 200D, which is a far better overall DSLR camera. ★★★½☆

Sensor	24.1Mp APS-C CMOS
Viewfinder	Pentamirror, 0.8x, 95%
ISO	100-6400 (12,800 exp)
AF	9-point (1 cross-type)
LCD	3-in, 920k-dots
Max burst (buffer)	3fps
Memory card	SD/SDHC/SDXC

CANON EOS 250D (REBEL SL3)

TESTED IN ISSUE **168** PRICE: **£529/$600**

THE NEW EOS 250D/Rebel SL3 is not Canon's cheapest entry-level DSLR, but we think it's the best budget/beginner DSLR with the perfect blend of power and value. This is the body that will take people from snapping on their smartphones, to getting into the hobby. ★★★★☆

Sensor	24.1Mp APS-C CMOS
Viewfinder	Pentamirror, 0.87x, 95%
ISO	100-25,600 (51,200 exp)
AF	9-point (1 cross-type)
LCD	3-in vari-angle touch screen, 1040k
Max burst (buffer)	5fps
Memory card	SD/SDHC/SDXC

CANON EOS 850D (REBEL T8i)

TESTED IN ISSUE **172** PRICE: **£839/$749**

FOR ENTHUSIASTS looking to take the next step, the Canon EOS 850D is an impressive, lightweight yet powerful DSLR that captures detailed, colourful and sharper images, as well as 4K movies. Featuring iTR Face and Eye Detection AF and accurate Auto AF via optical viewfinder, the 850D is sure to satisfy. ★★★★☆

Sensor	24.1Mp Dual Pixel APS-C CMOS
Viewfinder	Pentamirror, 95% coverage, 0.82x
ISO	100-25,600
AF	45 cross-type AF point system
LCD	3-in vari-angle touch-screen, 1040k
Max burst (buffer)	7fps
Memory card	SD/SDHC/SDXC

ENTHUSIAST

CANON EOS 77D

TESTED IN ISSUE **156** PRICE with 18-135mm kit lens: **£1030/$1400**

THE key specs are identical to the 800D, but the extra top-plate LCD gives at-a-glance access to vital shooting info, while a rear control wheel makes dialing in exposure settings much quicker, promoting it to Canon's 'enthusiast' range. Super image quality – even at high ISOs. ★★★★½

Sensor	24.2Mp, APS-C (6000x4000 pixels)
Viewfinder	Pentamirror, 0.82x, 95%
ISO	100-25,600 (51,200 exp)
AF	45-point (all cross-type)
LCD	3-in vari-angle touch-screen, 1040k
Max burst (buffer)	6fps (27 Raw/Unlimited JPEG)
Memory card	SD/SDHC/SDXC

CANON EOS 90D

TESTED IN ISSUE **168** PRICE: **£1199/$1199**

THE Canon 90D is a heavyweight replacement for the 80D, and this decathlete crop-camera comes with a new 32.5Mp sensor, super-quick 10fps continous shooting and 4K video, plus improved handling. This camera is an ideal APS-C camera upgrade for enthusiasts and beyond. ★★★★½

Sensor	32.5Mp, APS-C (6960x4640 pixels)
Viewfinder	Pentaprism, 0.95x, 100%
ISO	100-25,600 (51,200 exp)
AF	45-point (all cross-type)
LCD	3-in vari-angle touch-screen, 1040k
Max burst (buffer)	10fps (25 Raw/58 JPEG)
Memory card	SD/SDHC/SDXC

CANON EOS 7D Mk II

TESTED IN ISSUE **159** PRICE: **£1429/$1400**

HERE'S the king of action-packed APS-C format EOS cameras. A little long in the tooth now, but it still has 65-point AF with advanced tracking, 10fps continuous drive, dual DIGIC 6 processors and GPS, all wrapped up in a tough, weather-sealed magnesium alloy shell. ★★★★★

Sensor	20.2Mp, APS-C (5472x3648 pixels)
Viewfinder	Pentaprism, 1.0x, 100%
ISO	100-16,000 (51,200 exp)
AF	65-point (all cross-type)
LCD	3-in, 1040k dots
Max burst (buffer)	10fps (31 Raw/Unlimited JPEG)
Memory card	CompactFlash + SD/SDHC/SDXC

CANON EOS 6D Mk II

TESTED IN ISSUE **168** PRICE: **£1349/$1600**

THE world's smallest full-frame DSLR – with a vari-angle touchscreen LCD – gets a major upgrade over the original 6D with improved speed and performance rather than outright image quality. It's a great all-rounder now thanks to an improved AF system and burst rate. ★★★★½

Sensor	26.2Mp, full-frame (6240x4160 pixels)
Viewfinder	Optical pentaprism, 98%
ISO	100-40,000 (50-102,400 exp)
AF	45-point (all cross-type)
LCD	3-in vari-angle touch-screen, 1040k
Max burst (buffer)	6.5fps (21 Raw/150 JPEG)
Memory card	SD/SDHC/SDXC

PROFESSIONAL

CANON EOS 5D Mk IV

TESTED IN ISSUE **168** PRICE: **£2789/$2499**

A SUPERB all-rounder, the pro-level weather-sealed full-frame 5D Mk IV combines a stunning hi-res 30Mp sensor with a swift 7fps frame rate. Its impressive specs list includes 4K video, a touchscreen LCD, Wi-Fi and NFC connectivity, and GPS to automatically geotag images. ★★★★★

Sensor	30.4Mp, full-frame (6720x4480 pixels)
Viewfinder	Pentaprism, 0.71x, 100%
ISO	100-32,000 (50-102,400 exp)
AF	61-point (41 cross-type, 5 dual-cross)
LCD	3.2-in touch-screen, 1620k dots
Max burst (buffer)	7fps (21 Raw/Unlimited JPEG)
Memory card	CompactFlash + SD/SDHC/SDXC

CANON EOS 5DS (5DS R)

TESTED IN ISSUE **148** PRICES: **£2349/$3700**

THE world's first 50Mp full-frame DSLR delivers huge *and* amazingly detailed hi-res images. The higher-cost 5DS R adds a 'low-pass cancellation filter' for marginally sharper shots. As expected with such a high-res sensor, max ISO and drive rate are lower than with the 5D Mk IV. ★★★★½

Sensor	50.6Mp, full-frame (8688x5792 pixels)
Viewfinder	Pentaprism, 0.71x, 100%
ISO	100-6400 (50-12,800 exp)
AF	61-point (41 cross-type, 5 dual-cross)
LCD	3.2-in, 1040k dots
Max burst (buffer)	5fps (14 Raw/510 JPEG)
Memory card	CompactFlash + SD/SDHC/SDXC

CANON EOS-1D X MARK III

TESTED IN ISSUE **164** PRICE: **£6500/$6500**

THE Canon EOS-1D X Mark III is the ultimate hybrid DSLR/mirrorless machine, with superb low-light performance up to ISO102,400, expandable to 819,200, Deep Learning AF and 5.5K Raw video. It can also capture up to 20fps in Live View mode making it a dream to shoot any action. ★★★★★

Sensor	20.1Mp full-frame (5472x3648 pixels)
Viewfinder	Pentaprism, 0.76x, 100% coverage
ISO	100-102,400 (exp 50-819,200)
AF	191-point (155 cross-type)
LCD	3.2-inch touchscreen, 2.1million dots
Max burst (buffer)	20fps (1000 Raw/Unlimited JPEG)
Memory card	2xCFexpress 1.0 Type B

PhotoPlus

BUYERS' GUIDE

With prices ranging from a couple of hundred to a few thousand, Canon has an EOS camera to suit everyone, from the complete beginner to most demanding pro…

What to look for

Canon EOS mirrorless cameras

When it comes to choosing mirrorless EOS cameras over DSLRs, there are pros and cons to consider. Canon's full-frame EOS R cameras are packed with the very latest tech including IBIS, Animal AF and 20fps via the electronic shutter in both the EOS R5 and R6. Without the mirror, R bodies are smaller than their DSLR equivalents (but only a fraction lighter). Compared to Optical Viewfinders on DSLRs, using an R's Electronic Viewfinder (EVF) is slower to focus due to lag and refresh rates, yet focusing via Live View with AF points all over the touchscreen is better. EOS R cameras can also use the next gen Canon RF lenses and their superior image quality (and superior size), but most R cameras and RF lenses are, currently, a lot more expensive.

MIRRORLESS CAMERAS

PRICES QUOTED ARE BODY-ONLY UNLESS STATED

FULL-FRAME EOS R

CANON EOS R5

TESTED IN ISSUE **169** PRICE : **£4199/$3899**

THE Canon EOS R5 is deserving of the hype: it's the perfect amalgamation of the R's full-frame form, the 5D's function, the pro-grade autofocus of the flagship 1D X Mark III DSLR, plus with near-medium format resolution, 20fps burst speeds and mirrorless magic like IBIS and amazingly-intelligent Animal AF. ★★★★½

Sensor	45Mp full-frame CMOS
Viewfinder	OLED EVF, 5690k dots
ISO	100-51,200 (50-102,400 exp)
AF	5940 Dual Pixel CMOS AF II
LCD	3.15-in articulating touch-screen, 2100k dots
Max burst (buffer)	12fps mechanical, 20fps electronic
Memory card	CFexpress type B, UHS-II SD/SDHC/SDXC

CANON EOS R

TESTED IN ISSUE **168** PRICE: **£1880/$1799**

THE full-frame mirrorless Canon EOS R boasts the new RF mount and fully articulated Dual Pixel AF touchscreen with 5655 AF points. Equivalent in many specs to the EOS 5D Mark IV, it's an attractive way for those looking to experience mirrorless photography. ★★★★½

Sensor	30.3Mp full-frame CMOS
Electronic viewfinder	0.5-in EVF, 3.69million dots
ISO	100-40,000 (50-102,400 exp)
AF	5655 Dual Pixel AF points
LCD	3.2-in fully articulating touchscreen
Max burst (buffer)	Approx. 8fps (47 Raw, 100JPEG)
Memory card	1x SD/SDHC/SDXC and UHS-II

CANON EOS R6

TESTED IN ISSUE **170** PRICE: **£2499/$2499**

THE R6 is built for speed, ideal for enthusiast and semi-pro sports and wildlife photographers, it can shoot up to 20fps with amazing Deep Learning AF and insanely handy IBIS. Plus with magnificent build, all weather sealed, and a fast and bright EVF, the R6 is an impressive upgrade. ★★★★½

Sensor	20.1Mp, full-frame CMOS
Viewfinder	0.5-in EVF, 3690 million dots
ISO	100-102,400 (50-204,800 exp)
AF	6072 Dual Pixel CMOS AF II
LCD	3-in vari-angle touch-screen, 1040k
Max burst (buffer)	12fps mechanical, 20fps electronic
Memory card	2x UHS-II SD/SDHC/SDXC

CANON EOS RP

TESTED IN ISSUE **168** PRICE: **£1299/$1400**

CANON is catering to crop-sensor CSC M or EOS DSLR users looking for a full-frame upgrade that won't break the bank. The EOS RP is strong spec package that's notably smaller, lighter and cheaper than almost all its rivals, and ideal as an 'entry-level' full-frame camera. ★★★½

Sensor	26.2Mp, full-frame CMOS
Viewfinder	0.39-in EVF, 2.36 million dots
ISO	100-40,000 (50-102,400 exp)
AF	4779 Dual Pixel AF positions
LCD	3-in vari-angle touch-screen, 1040k
Max burst (buffer)	5fps (50 Raw/Unlimited JPEG)
Memory card	SD/SDHC/SDXC and UHS-II

CANON EOS M200

TESTED IN ISSUE **160** PRICE with 15-45mm kit lens: **£550/$550**

CANON'S EOS M200 is aimed at attracting Instagramers and smartphone upgraders to Canon's mirrorless M range, and has an appealing spec list including its 24Mp sensor and plenty of easy-to-use features for beginners. It shoots 4K video to slea the deal. ★★★½☆

Sensor	24.1Mp APS-C CMOS
Viewfinder	No
ISO	100-25,600 (51,200 exp)
AF	143-point AF
LCD	3-in tilting touchscreen, 1040k dots
Max burst (buffer)	6.1 fps
Memory card	SD/SDHC/SDXC and UHS-1

CANON EOS M50 MARK II

TESTED IN ISSUE **179** PRICE: **£589/$599**

IF YOU'RE coming to the EOS M system afresh, the EOS M50 Mark II is a compact and capable camera, taking great stills and 1080p video, ideal for travel, everyday imaging and vlogging and content creation. But if you need to record 4K then this isn't the camera for you. ★★★★½

Sensor	24.1Mp CMOS APS-C
Viewfinder	OLED EVF, 2.36 million dots
ISO	100-25,600 (exp. to 51,200)
AF	Dual Pixel CMOS AF, 3975 focus positions
LCD	3-in articulating touchscreen, 1040k dots
Max burst (buffer)	10fps
Memory card	1x SD UHS-I

CANON EOS M6 MARK II

TESTED IN ISSUE **164** PRICE: **£870/$850**

THE EOS M6 Mark II is Canon's new compact, yet powerful mirrorless camera designed to deliver sharp images for amateurs always on the move. It has the same 32.5Mp APS-C sensor as the new Canon EOS 90D DSLR, but it's able to shoot in 14fps blasts, and even 30fps Raw image bursts, plus 'uncropped' 4K video. ★★★★½

Sensor	32.5Mp APS-C CMOS
Viewfinder	No
ISO	100-25,600
AF	143/99-point
LCD	3-in tilting touchscreen, 1040k dots
Max burst (buffer)	14fps (23 Raws, 54 JPEGs)
Memory card	SD/SDHC/SDXC and UHS-1

CANON EOS M5

TESTED IN ISSUE **168** PRICE with 15-45mm kit lens: **£600/$650**

AS Canon's flagship mirrorless M camera for enthusiasts, the EOS M5 really opens up the DSLR vs CSC debate. It shares much of the tech as the 80D, but swaps the optical viewfinder for an electronic version, making this compact system camera a pocket rocket. ★★★½☆

Sensor	24.2Mp APS-C CMOS
Viewfinder	OLED EVF, 2.36 million dots
ISO	100-25,600
AF	49-point AF
LCD	3.2-in tilting touchscreen, 1620k dots
Max burst (buffer)	9fps
Memory card	SD/SDHC/SDXC and UHS-1

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BUYERS' GUIDE

With more than 190 lenses for Canon EOS cameras, picking the best for the job can be a minefield. Here's the lowdown!

Choosing lenses

Key factors to watch out for

THE MAIN factors to consider in a lens are its focal length, maximum aperture, and whether or not it's full-frame compatible. We've categorized lenses by focal length range – from wide-angle to telephoto. The larger a lens's maximum aperture, the 'faster' it's considered to be. Zooms are more flexible than primes, but tend not to have such fast maximum apertures. Full-frame lenses will also work with 'crop-sensor' EOS DSLRs, but crop-sensor lenses aren't compatible with full-frame cameras. For Canon EOS R System mirrorless cameras you need dedicated Canon RF lenses.

KEY: ● BEST VALUE AWARD ● BEST ON TEST AWARD

WIDE-ANGLE ZOOMS

WIDE-ANGLE ZOOMS	Price	Full-frame	Max zoom	Image stabilization	Max aperture	Weight	Min focus distance	Max magnification	Filter size	Iris blades	Issue reviewed	Rating	Awards
Canon EF 8-15mm f/4L Fisheye USM	£1120/$1250	Yes	1.9x	No	f/4	540g	0.15m	0.34x	None	7	90	★★★★	
Canon EF-S 10-18mm f/4.5-5.6 IS STM	£195/$299	No	1.8x	Yes	f/4.5-5.6	240g	0.22m	0.15x	67mm	7	176	★★★★	●
Canon EF-S 10-22mm f/3.5-4.5 USM	£500/$650	No	2.2x	No	f/3.5-4.5	385g	0.24m	0.17x	77mm	6	131	★★★½	
Canon EF 11-24mm f/4L USM	£2700/$2800	Yes	2.2x	No	f/4	1180g	0.28m	0.16x	None	9	131	★★★★½	
Canon RF 15-35mm F2.8L IS USM	£2330/2300	Yes	2.3x	Yes	f/2.8	840	0.28m	0.21x	82mm	9	159	★★★★	
Canon EF 16-35mm f/2.8L III USM	£2159/$2199	Yes	2.2x	No	f/2.8	790g	0.28m	0.22x	82mm	9	176	★★★★½	
Canon EF 16-35mm f/4L IS USM	£999/$1099	Yes	2.2x	Yes	f/4	615g	0.28m	0.23x	77mm	9	176	★★★★★	●
Canon EF 17-40mm f/4L USM	£720/$750	Yes	2.4x	No	f/4	500g	0.28m	0.24x	77mm	7	113	★★★★½	
Sigma 8-16mm f/4.5-5.6 DC HSM	£600/$800	No	2.0x	No	f/4.5-5.6	555g	0.24m	0.13x	None	7	143	★★★★	
Sigma 10-20mm f/3.5 EX DC HSM	£319/$399	No	2.0x	No	f/3.5	520g	0.24m	0.15x	82mm	7	176	★★★★	
Sigma 12-24mm f/4 DG HSM A	£1269/$1599	Yes	2.0x	No	f/4	1150g	0.24m	0.2x	None	9	176	★★★★½	
Sigma 14-24mm f/2.8 DG HSM A	£1129/$1199	Yes	0.19x	No	f/2.8	1150g	0.26m	0.19x	None	9	176	★★★★★	●
Sigma 24-35mm f/2 DG HSM A	£760/$900	Yes	1.5x	No	f/2	940g	0.28m	0.23x	77mm	7	113	★★★½	
Tamron 10-24mm f/3.5-4.5 Di II VC HLD	£449/$499	No	0.19x	Yes	f/3.5-4.5	440g	0.24m	0.19x	77mm	7	176	★★★★★	●
Tamron SP 15-30mm f/2.8 Di VC USD	£930/$1100	Yes	2.0x	Yes	f/2.8	1100g	0.28m	0.2x	None	9	143	★★★★½	
Tamron SP 15-30mm f/2.8 Di VC USD G2	£1099/$1299	Yes	2.0x	Yes	f/2.8	1110g	0.28m	0.2x	None	9	176	★★★★½	
Tokina 11-16mm f/2.8 AT-X PRO DX II	£480/$500	No	1.8x	No	f/2.8	560g	0.28m	0.12x	77mm	9	87	★★★	
Tokina 11-20mm f/2.8 AT-X PRO DX	£499/$449	No	1.43x	No	f/2.8	560g	0.28m	0.12x	82mm	9	167	★★★★½	
Tokina 12-28mm f/4 AT-X Pro DX	£450/$400	No	2.3x	No	f/4	530g	0.25m	0.2x	82mm	9	116	★★★★	
Tokina 16-28mm f/2.8 FF	£699/$699	Yes	1.8x	No	f/2.8	940g	0.28m	0.19x	82mm	9	154	★★★★	
Tokina 17-35mm f/4 AT-X PRO FX	£570/$450	Yes	2.1x	No	f/4	600g	0.28m	0.21x	82mm	9			

TELEPHOTO ZOOMS

TELEPHOTO ZOOMS													
Canon EF-M 55-200mm f/4.5-6.3 IS STM	£249/$349	No	3.6x	Yes	f/4.5-6.3	260g	1.0m	0.21x	52mm	7	163	★★★★	
Canon EF-S 55-250mm f/4-5.6 IS STM	£299/$299	No	4.5x	Yes	f/4-5.6	375g	0.85m	0.29x	58mm	7	163	★★★½	
Canon EF 70-200mm f/2.8L IS III USM	£2149/$2099	Yes	2.9x	Yes	f/2.8	1480g	1.2m	0.21x	77mm	8	175	★★★★½	
Canon EF 70-200mm f/2.8L USM	£1330/$1250	Yes	2.9x	No	f/2.8	1310g	1.5m	0.16x	77mm	8	64	★★★★	
Canon EF 70-200mm f/4L IS II USM	£1309/$1299	Yes	2.9x	Yes	f/4	780g	1.0m	0.27x	72mm	9	175	★★★★	
Canon EF 70-200mm f/4L IS USM	£899/$1099	Yes	2.9x	Yes	f/4	760g	1.2m	0.21x	72mm	8	151	★★★★	
Canon EF 70-200mm f/4L USM	£589/$599	Yes	2.9x	No	f/4	705g	1.2m	0.21x	67mm	8	163	★★★★	
Canon RF 70-200mm F2.8L IS USM	£2659/$2699	Yes	2.9x	Yes	f/2.8	1070g	0.7m	0.23x	77mm	9	175	★★★★½	
Canon EF 70-300mm f/4-5.6 IS USM	£400/$650	Yes	4.3x	Yes	f/4-5.6	630g	1.5m	0.26x	58mm	8	123	★★★	
Canon EF 70-300mm f/4-5.6 IS II USM	£449/$499	Yes	4.3x	Yes	f/4-5.6	710g	1.2m	0.25x	67mm	9	163	★★★★½	●
Canon EF 70-300mm f/4-5.6L IS USM	£1199/$1349	Yes	4.3x	Yes	f/4-5.6	1050g	1.2m	0.21x	67mm	8	163	★★★★	
Canon EF 70-300mm f/4.5-5.6 DO IS USM	£1380/$1400	Yes	4.3x	Yes	f/4.5-5.6	720g	1.4m	0.19x	58mm	6	90	★★★	
Canon EF 75-300mm f/4-5.6 III	£210/$200	Yes	4.0x	No	f/4-5.6	480g	1.5m	0.25x	58mm	7	15	★★★	
Canon EF 75-300mm f/4-5.6 III USM	£260/$190	Yes	4.0x	No	f/4-5.6	480g	1.5m	0.25x	58mm	7	70	★★★	
Canon EF 100-400mm f/4.5-5.6L IS II USM	£2279/$2399	Yes	4.0x	Yes	f/4.5-5.6	1640g	0.98m	0.31x	77mm	9	182	★★★★	
Canon RF 100-500mm F4.5-7.1L IS USM	£2979/$2699	Yes	5x	Yes	f/4.5-71	1530g	0.9-1.2m	0.33x	77mm	9	182	★★★★½	
Canon EF 200-400mm f/4L IS USM Extender 1.4x	£11,209/$10,999	Yes	2.8x	Yes	f/4	3620g	2.0m	0.15x	52mm	9	182	★★★★½	
Sigma 50-100mm f/1.8 DC HSM A	£949/$1099	No	2.0x	None	f/1.8	1490g	0.95m	0.15x	82mm	9	175	★★★★	
Sigma 50-500mm f/4.5-6.3 DG OS HSM	£1160/$1660	Yes	10.0x	Yes	f/4.5-6.3	1970g	0.5-1.8m	0.32x	95mm	9	130	★★★½	
Sigma 60-600mm f/4.5-6.3 DG OS HSM Sport	£1699/$1999	Yes	10.0x	Yes	f/4.5-6.3	2700g	0.6-2.6m	0.3x	105mm	9	182	★★★★	
Sigma 70-200mm f/2.8 EX DG OS HSM	£900/$1300	Yes	2.9x	Yes	f/2.8	1430g	1.4m	0.13x	77mm	9	137	★★★★½	●
Sigma 70-200mm f/2.8 DG OS HSM S	£1179/$1379	Yes	2.9x	Yes	f/2.8	1805g	1.2m	0.21x	82mm	11	175	★★★★★	● ●
Sigma 70-300mm f/4-5.6 DG Macro	£130/$140	Yes	4.3x	No	f/4-5.6	545g	0.95m	0.5x	58mm	9	123	★★★	
Sigma APO 70-300mm f/4-5.6 DG Macro	£180/$180	Yes	4.3x	No	f/4-5.6	550g	0.95m	0.5x	58mm	9	137	★★★	
Sigma 100-400mm f/5-6.3 DG OS HSM C	£679/$609	Yes	4x	Yes	f/5-6.3	1160g	1.6m	0.26x	67mm	9	163	★★★★½	
Sigma 120-300mm f/2.8 DG OS HSM S	£2699/$3599	Yes	2.5x	Yes	f/2.8	3390g	1.5-2.5m	0.12x	105mm	9	175	★★★★½	
Sigma 150-600mm f/5-6.3 DG OS HSM C	£849/$899	Yes	4.0x	Yes	f/5-6.3	1930g	2.8m	0.2x	95mm	9	182	★★★★½	●
Sigma 150-600mm f/5-6.3 DG OS HSM S	£1329/$1849	Yes	4.0x	Yes	f/5-6.3	2860g	2.6m	0.2x	105mm	9	182	★★★★★	●
Tamron SP AF 70-200mm f/2.8 Di LD (IF) Macro	£630/$770	Yes	2.9x	No	f/2.8	1320g	0.95m	0.32x	77mm	9	137	★★★★	
Tamron SP 70-200mm f/2.8 Di VC USD G2	£1249/$1299	Yes	2.9x	Yes	f/2.8	1500g	0.95m	0.16x	77mm	9	175	★★★★★	●
Tamron 70-210mm f/4 DI VC USD	£549/$599	Yes	2.9x	Yes	f/4	860g	0.95m	0.32x	67mm	9	175	★★★★	
Tamron AF 70-300mm f/4-5.6 Di LD Macro	£130/$145	Yes	4.3x	No	f/4-5.6	458g	0.95m	0.5x	62mm	9	137	★★★	
Tamron SP AF 70-300mm f/4-5.6 Di VC USD	£329/$449	Yes	4.3x	Yes	f/4-5.6	765g	1.5m	0.25x	62mm	9	163	★★★★½	●
Tamron 100-400mm f/4.5-6.3 Di VC USD	£699/$799	Yes	4x	Yes	f/4-5.6	1135g	1.5m	0.28x	67mm	9	163	★★★★½	
Tamron SP 150-600mm f/5-6.3 Di VC USD	£830/$870	Yes	4.0x	Yes	f/5-6.3	1951g	2.7m	0.2x	95mm	9	130	★★★½	
Tamron SP 150-600mm f/5-6.3 Di VC USD G2	£1099/$1199	Yes	4.0x	Yes	f/5-6.3	2010g	2.2m	0.26x	95mm	9	182	★★★★½	

KEY: ● BEST VALUE AWARD ● BEST ON TEST AWARD

STANDARD ZOOMS

	Price	Full-frame	Max zoom	Image stabilization	Max aperture	Weight	Min focus distance	Max magnification	Filter size	Iris blades	Issue reviewed	Rating	Awards
Canon EF-S 15-85mm f/3.5-5.6 IS USM	£690/$799	No	5.7x	Yes	f/3.5-5.6	575g	0.35m	0.21x	72mm	7	142	★★★★	
Canon EF-S 17-55mm f/2.8 IS USM	£790/$549	No	3.2x	Yes	f/2.8	645g	0.35m	0.17x	77mm	7	142	★★★★½	●
Canon EF-S 18-55mm f/3.5-5.6 IS II	£170/$200	No	3.1x	Yes	f/3.5-5.6	200g	0.25m	0.34x	58mm	6	110	★★★	
Canon EF-S 18-55mm f/3.5-5.6 IS STM	£214/$106	No	3.1x	Yes	f/3.5-5.6	205g	0.25m	0.36x	58mm	7	162	★★★★	
Canon EF 24-70mm f/2.8L II USM	£1740/$1599	Yes	2.9x	No	f/2.8	805g	0.38m	0.21x	82mm	9	162	★★★★½	
Canon RF 24-70mm F2.8L IS USM	£2329/2299	Yes	2.9x	Yes	f/2.8	900g	0.21x	0.30x	82mm	9	162	★★★★★	●
Canon EF 24-70mm f/4L IS USM	£800/$849	Yes	2.9x	Yes	f/4	600g	0.38m	0.7x	77mm	9	162	★★★★	
Canon RF 28-70mm F2L USM	£2500/$3200	Yes	2.9x	No	f/2	1430g	0.39m	0.18x	95mm	9			
Canon EF 24-105mm f/3.5-5.6 IS STM	£579/$599	Yes	4.4x	Yes	f/3.5-5.6	525g	0.4m	0.3x	77mm	7	162	★★★★	
Canon EF 24-105mm f/4L IS II USM	£998/$1099	Yes	4.4x	Yes	f/4	795g	0.45m	0.24x	77mm	10	127	★★★★	
Canon RF 24-105mm F4-7.1 IS STM	£479/$399	Yes	0.5x	Yes	f/4-7.1	385g	0.13m	0.34x	67mm	7	180	★★★★½	
Canon RF 24-105mm F4L IS USM	£1119/$1099	Yes	4.4x	No	f/1.2	700g	0.40m	0.19x	77mm	9	162	★★★★½	
Sigma 17-50mm f/2.8 EX DC OS HSM	£330/$370	No	2.9x	Yes	f/2.8	565g	0.28m	0.2x	77mm	7	127	★★★½	
Sigma 17-70mm f/2.8-4 DC Macro OS HSM C	£350/$399	No	4.1x	Yes	f/2.8-4	465g	0.22m	0.36x	72mm	7	180	★★★★	
Sigma 18-35mm f/1.8 DC HSM A	£650/$800	No	1.9x	No	f/1.8	810g	0.28m	0.23x	72mm	9	90	★★★★★	
Sigma 24-70mm f/2.8 DG OS HSM A	£1200/$1200	Yes	2.9x	Yes	f/2.8	1,020g	0.38m	0.2x	82mm	9	142	★★★★★	● ●
Sigma 24-105mm f/4 DG OS HSM A	£600/$900	Yes	4.4x	Yes	f/4	885g	0.45m	0.22x	82mm	9	127	★★★★	
Tamron SP AF 17-50mm f/2.8 XR Di II VC	£420/$650	No	2.9x	Yes	f/2.8	570g	0.29m	0.21x	72mm	7	142	★★★½	
Tamron SP AF 24-70mm f/2.8 Di VC USD G2	£1250/$1200	Yes	2.9x	Yes	f/2.8	905g	0.38m	0.2x	82mm	9	142	★★★★½	
Tamron SP AF 28-75mm f/2.8 XR Di	£450/$500	Yes	2.7x	No	f/2.8	510g	0.33m	0.26x	67mm	7	57	★★★	

SUPERZOOMS

Canon EF-S 18-135mm f/3.5-5.6 IS STM	£290/$399	No	7.5x	Yes	f/3.5-5.6	480g	0.39m	0.28x	67mm	7	172	★★★★	
Canon EF-S 18-135mm f/3.5-5.6 IS USM	£489/$599	No	7.5x	Yes	f/3.5-5.6	515g	0.39m	0.28x	67mm	7	172	★★★★½	
Canon EF-S 18-200mm f/3.5-5.6 IS	£470/$700	No	11.1x	Yes	f/3.5-5.6	595g	0.45m	0.24x	72mm	6	128	★★★½	
Canon RF 24-240mm F4-6.3 IS USM	£859/$699	Yes	10x	Yes	f/4-6.3	750g	0.5m	0.26x	72mm	7	172	★★★★★	●
Canon EF 28-300mm f/3.5-5.6L IS USM	£2289/$2450	Yes	10.7x	Yes	f/3.5-5.6	1760g	0.7m	0.30x	77mm	8	153	★★★★	
Sigma 18-200mm f/3.5-6.3 DC Macro OS HSM C	£269/$399	No	11.1x	Yes	f/3.5-6.3	430g	0.39m	0.33x	62mm	7	172	★★★★	
Sigma 18-250mm f/3.5-6.3 DC Macro OS HSM	£350/$350	No	13.9x	Yes	f/3.5-6.3	470g	0.35m	0.34x	62mm	7	92	★★★★★	●
Sigma 18-300mm f/3.5-6.3 DC Macro OS HSM C	£369/$499	No	16.7x	Yes	f/3.5-6.3	585g	0.39m	0.33x	72mm	7	172	★★★★½	
Tamron 16-300mm f/3.5-6.3 Di II VC PZD Macro	£499/$629	No	18.8x	Yes	f/3.5-6.3	540g	0.39m	0.34x	67mm	7	172	★★★★	
Tamron 18-200mm f/3.5-6.3 Di II VC	£189/$199	No	11.1x	Yes	f/3.5-6.3	400g	0.49m	0.25x	62mm	7	172	★★★★	●
Tamron AF 18-270mm f/3.5-6.3 Di II VC PZD	£300/$450	No	15x	Yes	f/3.5-6.3	450g	0.49m	0.26x	62mm	7	128	★★★½	
Tamron 18-400mm f/3.5-6.3 Di II VC HLD	£599/$599	No	22.2x	Yes	f/3.5-6.3	710g	0.45m	0.34x	72mm	7	172	★★★★	

WIDE-ANGLE PRIMES

Canon EF 14mm f/2.8L II USM	£2000/$2100	Yes	None	No	f/2.8	645g	0.2m	0.15x	None	6			
Canon TS-E 17mm f/4L (tilt & shift)	£2000/$2150	Yes	None	No	f/4	820g	0.25m	0.14x	77mm	8	90	★★★★★	
Canon EF 20mm f/2.8 USM	£450/$540	Yes	None	No	f/2.8	405g	0.25m	0.14x	72mm	5	114	★★★½	
Canon EF-M 22mm f/2 STM	£229/$249	No	None	No	f/2	105g	0.15m	0.21x	43mm	7	180	★★★★	
Canon EF 24mm f/1.4L II USM	£1500/$1550	Yes	None	No	f/1.4	650g	0.25m	0.17x	77mm	8			
Canon EF 24mm f/2.8 IS USM	£529/$599	Yes	None	Yes	f/2.8	280g	0.2m	0.23x	58mm	7	180	★★★★½	
Canon EF-S 24mm f/2.8 STM	£159/$149	No	None	No	f/2.8	125g	0.16m	0.27x	52mm	7	180	★★★★	●
Canon TS-E 24mm f/3.5L II (tilt & shift)	£1690/$1900	Yes	None	No	f/3.5	780g	0.21m	0.34x	82mm	8			
Canon EF 28mm f/1.8 USM	£420/$510	Yes	None	No	f/1.8	310g	0.25m	0.18x	58mm	7	67	★★★	
Canon EF 28mm f/2.8 IS USM	£390/$500	Yes	None	Yes	f/2.8	260g	0.23m	0.2x	58mm	7	114	★★★★	
Canon EF 35mm f/1.4L II USM	£1650/$1650	Yes	None	No	f/1.4	760g	0.28m	0.21x	72mm	9	141	★★★★½	
Canon RF 35mm F1.8 IS Macro STM	£529/$499	Yes	None	Yes	f/1.8	305g	0.17m	0.5x	52mm	9	180	★★★★★	●
Canon EF 35mm f/2 IS USM	£539/$599	Yes	None	Yes	f/2	335g	0.24m	0.24x	67mm	8	180	★★★★½	
Irix 11mm f/4 Blackstone	£609/$650	Yes	None	No	f/4	790g	0.28m	0.13	None	9			
Irix 15mm f/2.4 Blackstone	£574/$675	Yes	None	No	f/2.4	685g	0.25m	0.11x	95mm	9	167	★★★★½	
Peleng 8mm f/3.5 Fisheye	£250/$215	Yes	None	No	f/3.5	400g	0.22m	0.13x	None				
Peleng 17mm f/2.8 Fisheye	£290/$290	Yes	None	No	f/2.8	630g	0.3m	N/S	None				
Samyang 8mm f/3.5 IF MC CSII DH Circular	£240/$260	No	None	No	f/3.5	435g	0.3m	N/S	None	6			
Samyang 10mm f/2.8 ED AS NCS CS	£379/$399	No	None	No	f/2.8	590g	0.25m	N/S	None	6	167	★★★★	
Samyang 12mm f/2.8 ED AS NCS Diagonal	£360/$470	Yes	None	No	f/2.8	530g	0.2m	N/S	None	7			
Samyang XP 14mm f/2.4	£899/$999	Yes	None	No	f/2.4	791g	0.27m	0.08x	None	9	167	★★★★	
Samyang 16mm f/2 ED AS UMC CS	£330/$360	No	None	No	f/2	590g	0.2m	N/S	77mm	8			
Samyang 24mm f/1.4 ED AS UMC	£480/$470	Yes	None	No	f/1.4	680g	0.25m	N/S	77mm	8			
Samyang T-S 24mm f/3.5 ED AS UMC (tilt & shift)	£680/$760	Yes	None	No	f/3.5	680g	0.2m	N/S	82mm	8	90	★★★★	
Samyang 35mm f/1.4 AS UMC AE	£489/$499	Yes	None	No	f/1.4	660g	0.3m	N/S	77mm	8	180	★★★★	
Sigma 4.5mm f/2.8 EX DC HSM Circular Fisheye	£700/$900	No	None	No	f/2.8	470g	0.14m	0.17x	None	6	87	★★★★	
Sigma 8mm f/3.5 EX DG Circular Fisheye	£700/$900	Yes	None	No	f/3.5	400g	0.14m	0.22x	None	6	87	★★★★	●
Sigma 10mm f/2.8 EX DC HSM Diagonal Fisheye	£600/$600	No	None	No	f/2.8	475g	0.14m	0.11x	None	7	87	★★★★	
Sigma 14mm f/1.8 DG HSM | A	£1299/$1399	Yes	None	No	f/1.8	1170g	0.27m	0.19x	None	9	155	★★★★½	
Sigma 15mm f/2.8 EX DG Diagonal Fisheye	£600/$610	Yes	None	No	f/2.8	370g	0.15m	0.26x	None	7	44	★★★★	
Sigma 16mm f/1.4 DC DN | C	£449/$400	Yes	None	No	f/1.4	405g	0.25m	0.1x	67mm	9	161	★★★★½	
Sigma 20mm f/1.4 DG HSM A	£700/$900	Yes	None	No	f/1.4	950g	0.28m	0.14x	77mm	9	114	★★★★★	
Sigma 24mm f/1.4 DG HSM A	£650/$850	Yes	None	No	f/1.4	665g	0.25m	0.19x	77mm	9	114	★★★★★	●
Sigma 30mm f/1.4 DC DN | C	£329/$339	Yes	None	No	f/1.4	270g	0.3m	0.14x	52mm	9	161	★★★★½	
Sigma 35mm f/1.4 DG HSM A	£699/$699	Yes	None	No	f/1.4	665g	0.3m	0.19x	67mm	9	180	★★★★½	
Sigma 56mm f/1.4 DC DN | C	£349/$429	Yes	None	No	f/1.4	280g	0.5m	0.14x	55mm	9	166	★★★★½	●
Tamron SP 35mm f/1.8 Di VC USD	£649/$599	Yes	None	Yes	f/1.8	480g	0.2m	0.4x	67mm	9	180	★★★★½	
Zeiss Milvus 15mm f/2.8 ZE	£2330/$2700	Yes	None	No	f/2.8	947g	0.25m	0.11x	95mm	9			
Zeiss Distagon T* 18mm f/3.5 ZE	£1090/$1395	Yes	None	No	f/3.5	510g	0.3m	0.08x	82mm	9	44	★★★★★	●
Zeiss Milvus 21mm f/2.8 ZE	£1400/$1850	Yes	None	No	f/2.8	851g	0.22m	0.2x	82mm	9			
Zeiss Distagon T* 25mm f/2 ZE	£1270/$1700	Yes	None	No	f/2	600g	0.25m	0.17x	67mm	9			
Zeiss Distagon T* 28mm f/2 ZE	£980/$1285	Yes	None	No	f/2	580g	0.24m	0.21x	58mm	9			
Zeiss Otus 28mm f/1.4 ZE	£3500/$5000	Yes	None	No	f/1.4	1350g	0.3m	0.2x	95mm	9			
Zeiss Milvus 35mm f/2 ZE	£935/$1120	Yes	None	No	f/2	702g	0.3m	0.19x	58mm	9	141	★★★★	

PhotoPlus

BUYERS' GUIDE

Contacts

Canon www.canon.co.uk
Peleng www.digitaltoyshop.co.uk
Samyang www.samyang-lens.co.uk
Schneider www.linhofstudio.com
Sigma www.sigma-imaging-uk.com
Tamron www.tamron.co.uk
Tokina www.tokinalens.com
Zeiss www.zeiss.co.uk

KEY: ● BEST VALUE AWARD ● BEST ON TEST AWARD

STANDARD PRIMES

STANDARD PRIMES

	Price	Full-frame	Max zoom	Image stabilization	Max aperture	Weight	Min focus distance	Max magnification	Filter size	Iris blades	Issue reviewed	Rating	Awards
Canon EF 40mm f/2.8 STM	£200/$180	Yes	None	No	f/2.8	130g	0.3m	0.18x	52mm	7	141	★★★★	
Canon TS-E 45mm f/2.8 (tilt & shift)	£1200/$1400	Yes	None	No	f/2.8	645g	0.4m	0.16x	72mm	8			
Canon EF 50mm f/1.2L USM	£1370/$1350	Yes	None	No	f/1.2	580g	0.45m	0.15x	72mm	8	103	★★★★	
Canon EF 50mm f/1.4 USM	£385/$350	Yes	None	No	f/1.4	290g	0.45m	0.15x	58mm	8	146	★★★	
Canon EF 50mm f/1.8 STM	£99/$125	Yes	None	No	f/1.8	160g	0.35m	0.21x	49mm	7	166	★★★½	
Canon RF 50mm F1.2L USM	£2349/$2299	Yes	None	No	f/1.2	950g	0.40m	0.15x	77mm	10	146	★★★★½	
Canon RF 50mm F1.8 STM	£219/$199	Yes	None	No	f/1.8	160g	0.30m	0.25x	43mm	7	176	★★★★½	
Samyang 50mm f/1.4 AS UMC	£310/$350	Yes	None	No	f/1.4	575g	0.45m	N/S	77mm	8			
Sigma 30mm f/1.4 DC HSM A	£349/$499	No	None	No	f/1.4	435g	0.3m	0.15x	62mm	9	166	★★★★	
Sigma 50mm f/1.4 DG HSM A	£600/$950	Yes	None	No	f/1.4	815g	0.4m	0.18x	77mm	9	140	★★★★½	●
Tamron SP 45mm f/1.8 Di VC USD	£480/$400	Yes	None	Yes	f/1.8	540g	0.29m	0.29x	67mm	9	146	★★★★½	
Tokina Opera 50mm f/1.4 FF	£879/$949	Yes	None	No	f/1.4	950g	0.4m	0.18x	72mm	9	148	★★★★½	
Zeiss Milvus 50mm f/1.4 ZF.2	£1000/$1200	Yes	None	No	f/1.4	922g	0.45m	0.15x	67mm	9	146	★★★★½	
Zeiss Planar T* 50mm f/1.4 ZE	£560/$725	Yes	None	No	f/1.4	380g	0.45m	0.15x	58mm	9			
Zeiss Otus 55mm f/1.4	£2700/$3990	Yes	None	No	f/1.4	1030g	0.5m	0.15x	77mm	9			

TELEPHOTO PRIMES

TELEPHOTO PRIMES

Canon EF 85mm f/1.2L II USM	£1999/$1999	Yes	None	No	f/1.2	1025g	0.95m	0.11x	72mm	8	179	★★★★	
Canon EF 85mm f/1.4L IS USM	£1489/$1599	Yes	None	Yes	f/1.4	950g	0.85m	0.12x	77mm	9	179	★★★★★	●
Canon EF 85mm f/1.8 USM	£365/$369	Yes	None	No	f/1.8	425g	0.85m	0.13x	58mm	8	159	★★★★	
Canon RF 85mm F1.2L USM	£2869/$2699	Yes	None	No	f/1.2	1195g	0.85m	0.12x	82mm	9	179	★★★★★	●
Canon TS-E 90mm f/2.8 (tilt & shift)	£1240/$1400	Yes	None	No	f/2.8	565g	0.5m	0.29x	58mm	8			
Canon EF 100mm f/2 USM	£410/$500	Yes	None	No	f/2	460g	0.9m	0.14x	58mm	8	46	★★★★★	
Canon EF 135mm f/2L USM	£940/$1000	Yes	None	No	f/2	750g	0.9m	0.19x	72mm	8			
Canon EF 200mm f/2L IS USM	£5400/$5700	Yes	None	Yes	f/2	2520g	1.9m	0.12x	52mm	8	98	★★★★★	
Canon EF 200mm f/2.8L II USM	£700/$750	Yes	None	No	f/2.8	765g	1.5m	0.16x	72mm	8	98	★★★★	
Canon EF 300mm f/2.8L IS II USM	£5800/$6100	Yes	None	Yes	f/2.8	2400g	2.0m	0.18x	52mm	9	54	★★★★★	
Canon EF 300mm f/4L IS USM	£1140/$1350	Yes	None	Yes	f/4	1190g	1.5m	0.24x	77mm	8	117	★★★★	
Canon EF 400mm f/2.8L IS II USM	£9900/$10,000	Yes	None	Yes	f/2.8	3850g	2.7m	0.17x	52mm	9	54	★★★★★	
Canon EF 400mm f/4 DO IS II USM	£7000/$6900	Yes	None	Yes	f/4	2100g	3.3m	0.13x	52mm	9			
Canon EF 400mm f/5.6L USM	£1180/$1180	Yes	None	No	f/5.6	1250g	3.5m	0.12x	77mm	8	117	★★★½	
Canon EF 500mm f/4L IS II USM	£8400/$9000	Yes	None	Yes	f/4	3190g	3.7m	0.15x	52mm	9			
Canon EF 600mm f/4L IS II USM	£11,350/$11,500	Yes	None	Yes	f/4	3920g	4.5m	0.15x	52mm	9			
Canon RF 600mm F11 IS STM	£709/$699	Yes	None	Yes	f/11	930g	4.5m	0.14x	82mm	N/A	182	★★★★	
Canon EF 800mm f/5.6L IS USM	£11,900/$13,000	Yes	None	Yes	f/5.6	4500g	6.0m	0.14x	52mm	8			
Samyang MF 85mm f/1.4 RF	£319/$379	Yes	None	No	f/1.4	730g	1.1m	0.09x	72mm	8	179	★★★★	●
Samyang AF 85mm f/1.4 EF	£599/$699	Yes	None	No	f/1.4	485g	0.9m	0.11x	77mm	9	159	★★★★	
Samyang 135mm f/2 ED UMC	£370/$530	Yes	None	No	f/2	830g	0.8m	N/S	77mm	9			
Samyang 500mm MC IF f/6.3 Mirror	£125/$150	Yes	None	No	f/6.3	705g	2.0m	N/S	95mm	0			
Sigma 85mm f/1.4 DG HSM A	£929/$1099	Yes	None	No	f/1.4	TBA	0.85m	0.12x	86mm	9	179	★★★★½	
Sigma APO 300mm f/2.8 EX DG HSM	£2600/$3400	Yes	None	No	f/2.8	2400g	2.5m	0.13x	46mm	9	98	★★★★	
Sigma APO 500mm f/4.5 EX DG HSM	£3600/$4400	Yes	None	No	f/4.5	3150g	4.0m	0.13x	46mm	9			
Sigma 500mm f/4 DG OS HSM S	£5000/$6000	Yes	None	Yes	f/4	TBA	3.5m	0.15x	46mm	9	9		
Sigma APO 800mm f/5.6 EX DG HSM	£5000/$6600	Yes	None	No	f/5.6	4.9kg	7.0m	0.11x	46mm	9	21	★★★★	
Tamron SP 85mm f/1.8 Di VC USD	£750/$750	Yes	None	Yes	f/1.8	700g	0.8m	0.14x	67mm	9	159	★★★★½	
Zeiss Milvus 85mm f/1.4 ZE	£1380/$1800	Yes	None	No	f/1.4	1280g	0.8m	0.14x	77mm	9			
Zeiss Milvus 135mm f/2 ZE	£1900/$2200	Yes	None	No	f/2	1123g	0.8m	0.28x	77mm	9			

MACRO

MACRO

Canon EF-M 28mm f/3.5 Macro IS STM	£309/$299	No	None	Yes	f/3.5	130g	0.097m	1.2x	44.8mm	7	177	★★★★	
Canon EF-S 35mm f/2.8 Macro IS STM	£379/$349	No	None	Yes	f/2.8	190g	0.13m	1.0x	56mm	7	177	★★★★	
Canon EF-S 60mm f/2.8 Macro USM	£399/$350	No	None	No	f/2.8	335g	0.20m	1.0x	52mm	7	164	★★★½	
Canon MP-E65mm f/2.8 1-5x Macro	£980/$1050	Yes	None	No	f/2.8	710g	0.24m	5.0x	58mm	6	50	★★★★	
Canon EF 100mm f/2.8 Macro USM	£499/$599	Yes	None	No	f/2.8	600g	0.31m	1.0x	58mm	8	177	★★★★	
Canon EF 100mm f/2.8L Macro IS USM	£969/$1299	Yes	None	Yes	f/2.8	625g	0.3m	1.0x	67mm	9	177	★★★★½	
Canon EF 180mm f/3.5L Macro USM	£1330/$1400	Yes	None	No	f/3.5	1090g	0.48m	1.0x	72mm	8	69	★★★★	
Canon RF 85mm F2 Macro IS STM	£669/$599	Yes	None	Yes	f/2	500g	0.35m	0.5x	67mm	9	179	★★★★½	
Canon RF 100mm F2.8L Macro IS USM	£1479/$1399	Yes	None	Yes	f/2.8	730g	0.3m	1.4x	67mm	9	182	★★★★★	
Sigma 70mm f/2.8 DG macro Art	£449/$569	Yes	None	No	f/2.8	515g	0.26m	1.0x	49mm	9	177	★★★★½	
Sigma 105mm f/2.8 EX DG OS HSM Macro	£359/$569	Yes	None	No	f/2.8	725g	0.31m	1.0x	62mm	9	177	★★★★½	●
Sigma Macro 105mm f/2.8 EX DG OS HSM	£359/$469	Yes	None	Yes	f/2.8	725g	0.31m	1.0x	62mm	9	164	★★★★½	●
Sigma APO Macro 150mm f/2.8 EX DG OS HSM	£780/$1100	Yes	None	Yes	f/2.8	1150g	0.38m	1.0x	72mm	9	138	★★★★½	
Sigma APO Macro 180mm f/2.8 EX DG OS HSM	£1250/$1700	Yes	None	Yes	f/2.8	1640g	0.47m	1.0x	86mm	9	102	★★★★	
Tamron SP AF 60mm f/2 Di II LD (IF) Macro	£350/$525	No	None	No	f/2	350g	0.23m	1.0x	55mm	7	138	★★★½	
Tamron SP AF 90mm f/2.8 Di Macro	£350/$500	Yes	None	No	f/2.8	400g	0.29m	1.0x	55mm	9	102	★★★	
Tamron SP AF 90mm f/2.8 Di VC USD Macro	£649/$649	Yes	None	Yes	f/2.8	610g	0.3m	1.0x	62mm	9	177	★★★★★	●
Tamron SP AF 180mm f/3.5 Di Macro	£800/$740	Yes	None	No	f/3.5	985g	0.47m	1.0x	72mm	7	69	★★★	
Tokina 100mm f/2.8 AT-X PRO Macro	£350/$410	Yes	None	No	f/2.8	540g	0.3m	1.0x	55mm	9	118	★★★★	
Zeiss Milvus Makro Planar 100mm f/2 ZE	£1300/$1840	Yes	None	No	f/2	843g	0.44m	0.5x	67mm	9	50	★★★★	

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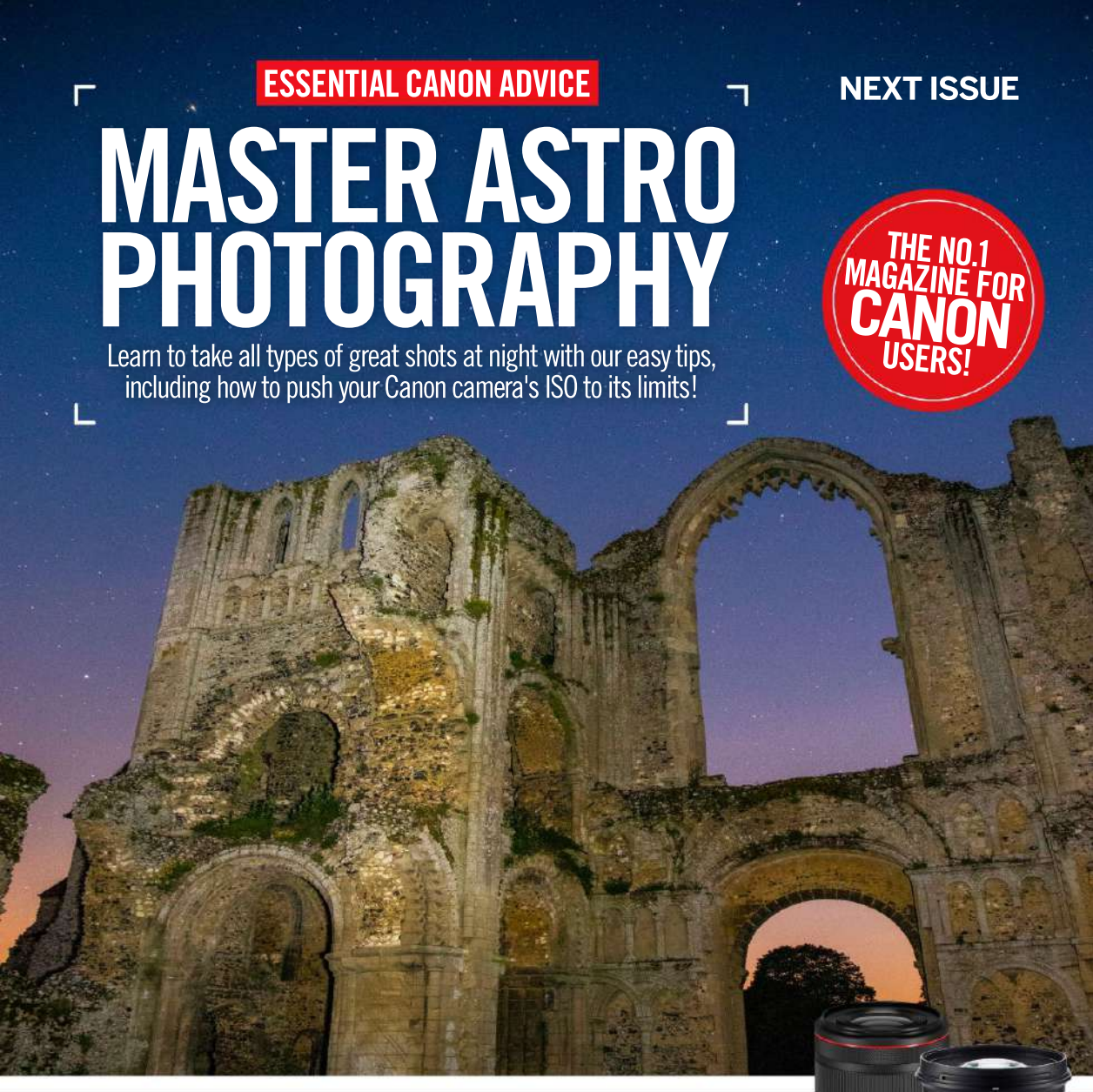

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* Content subject to change

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FOCUSPOINT

We'd love to hear your thoughts on the magazine and all things photographic! Email us at photoplus@futurenet.com

Letter of the Month

In the 1980s I purchased a range of new Canon FD lenses for my AE program camera. I loved the detailed, rich images and the solid, beautifully damped action with quality glass, which I enjoyed using into the 1990s. With the age digital and autofocus, I put the lenses away, but could not find satisfaction with any new camera.

Thankfully, mirrorless Canons came to my rescue. My wife (bless her) found my old FD lenses and, after research, I bought a used, but perfect, Canon M5. I learned that adaptors with lenses can affect the images, but Fotga have created an adaptor that allows the detail and rich colours to shine. Infinity focus is available (at the end of the focus stop on all lenses) and very little post-work is required.

I've found the M5 perfectly suited to the lenses and is great to use with so much control on the top of the camera. The focus peaking works superbly and caters for lenses that are not 'talking' to the camera. My enthusiasm for photography is now restored and I'm loving every moment. Here's a sample shot of a sunflower taken with the M5.

Nigel Dakin, Leicester

Who else has a unique lens setup with their camera? Email us at photoplus@futurenet.com

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The month in numbers

102,400

Maximum expanded high ISO setting available on a Canon EOS 6D Mark II via the red shooting menu – page 48

30

Canon's new EOS R3 pro mirrorless camera tops out at 30fps max burst with electronic shutter – page 86

f/16

Learn about the 'sunny f/16 rule' to help work out a manual exposure when taking portaits in sunshine – page 44

DigitalCameraWorld.com The best from our brilliant website

Image: Canon

Canon's first pro camera, the Canon EOS-1D, turns 20 years old

Canon's first professional DSLR marked a major step forward. On its 20th birthday, we take a look back at the Canon EOS-1D. More Canon news at DigitalCameraWorld.com, more on this story at **bit.ly/1Dbday**

Image: Future

The top 10 weirdest cameras we saw at The Photography Show 2021!

A Canon egg, a Nikon covered in spikes, a Pepsi can camera... here are the 10 weirdest cameras at The Photography Show! For more news see DigitalCameraWorld.com, more on these weird cams via link **bit.ly/weirdcams**

Image: Canon

This is what 30fps bursts look like on the rapid-fire Canon EOS R3

It's faster than the frame-rate of a movie! This is what happens when you shoot 30fps bursts on the Canon EOS R3. More on this article via quick at link **bit.ly/rapidR3** plus more great Canon articles at DigitalCameraWorld.com

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